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# THE MILITARY SURGEON

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JOURNAL OF  
THE ASSOCIATION OF MILITARY SURGEONS  
OF THE UNITED STATES

EDITED BY  
JAMES ROBB CHURCH

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VOLUME LI

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WASHINGTON, D. C.  
THE ASSOCIATION OF MILITARY SURGEONS  
OF THE UNITED STATES

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# THE MILITARY SURGEON

VOL. LI

JULY, 1922

NUMBER 1

## SOME CELEBRATED MARCHES DURING WAR

BY MAJOR ROMULUS ADAMS FOSTER

*Medical Corps, D. C. National Guard, Retired*

ACCORDING to military surgeons and others who have given the matter serious study, with proper training, men will march easily from 100 to 1,000 miles, or from 12 to 16 miles a day, and be all the better for it; "but after the 2d or 3d week," says Dr. Parkes, "there must be one halt in the week besides Sunday. If not, the work begins to tell on the men; they get out of condition, the muscles get soft, appetite declines, and there may be even a little anemia."

It is important to remember that the larger the body of men, the slower the march; that a large army will not march more than 14 miles in ten hours, and that a march of 20 miles by a soldier weighing 150 pounds, and carrying 54 pounds (approximate weight of field equipment, etc., at the time of the marches to be mentioned), is equivalent to lifting 481 tons one foot as against 353 tons in a walk of the same distance without a load.<sup>1</sup>

It should also be borne in mind that head winds, snow or rain, bad or slippery roads, constant halts from obstructions, heat, want of food, thirst, etc., all delay marches. For instance, very strong head winds will cause a difference of from 20 to 25 per cent and snow or rain from 10 to 15 per cent.

Therefore, in view of the foregoing, the marches to be now briefly described or narrated fully justified historians and other writers in characterizing them as celebrated.

General Sherman made about 14 miles a day in his celebrated march across the Southern States. Referring to this march in his official report, he says: "The men had marched for long periods, without regular rations or supplies of any kind, through mud and over rocks,

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<sup>1</sup>Formula:  $\frac{(W + W') \times D}{20 \times 2240}$ , where  $W$  is the weight of the person,  $W'$  the weight carried;  $D$  the distance walked in feet; 20 the coefficient of traction; and 2,240 the number of pounds in a ton. The result is the number of tons raised one foot. To get the distance in feet, multiply 5,280 by the number of miles walked.

and sometimes barefooted." The length of the march was about 400 miles.

Several days before the battle of Waterloo, Napoleon made a forced march to surprise the English and Prussians, but only accomplished  $18\frac{2}{3}$  miles. In this march a river (the Sambre) had to be crossed. Says the historian Martin: "The Sambre was not crossed by all the troops at the appointed hour; General Gerard's division, which was the farthest off, being delayed by distance and bad roads, and Vandamme's division not receiving marching orders in due time."

Daly's Guide Corps marched from near Peshawur to Delhi—a distance of 580 miles—in twenty-two days, the average daily march being  $26\frac{1}{3}$  miles.

Von der Tann's Bavarian army, in retreat, accomplished 42 miles in twenty-six hours, equivalent to 38.76 miles in one day.

The forces of Colonel De Salis and Captain Rennie marched 40 miles in one day, and during the Indian mutiny several regiments marched 30 miles a day for several days.

The 18th Division of the Saxon army, in the various maneuvers about Orleans in December, 1870, marched 54 miles in two days, 27 miles a day.

In India, in 1857, one of the regiments forming the Light Division, the 52d, marched 42 miles in twenty hours.

Sir Hope Grant says that the 1st Bengal Fusiliers marched 68 miles in thirty-eight hours; equal to 43 miles in one day.

The Russian foot guards, in advancing to Paris in 1814, marched 48 miles in twenty-six hours; equal to 44 miles in one day.

It is related that General Whitlock, to relieve Kirwee in 1858, marched 86 miles in thirty-seven hours; equivalent to 55.78 miles in one day. This is one of the extraordinary forced marches.

On September 3, 1709, the Prince of Hesse-Cassel, in order to secure the passage of the Haine, made a march of 49 miles in fifty-six hours. In Coxe's "Memoirs of the Duke of Marlborough" this march is referred to as follows:

On the 3d of September, after the capitulation of the citadel, the Prince of Hesse-Cassel was dispatched at four in the afternoon with 60 squadrons of horse and 4,000 foot, under the command of General Dedem. He was to follow Lord Orkney, and if he found him master of St. Ghislain, to pass the Haine and invest Mons on the southwest; but should that fortress remain in the possession of the enemy, he was to take a circuitous route by Nimy and Obourg, and effect his purpose by forcing the ill-guarded lines on the Trouille. . . . Notwithstanding the severity of the weather, the Prince of Hesse prosecuted his march with unremitting ardour. Finding that the attempt on St. Ghislain had failed, he proceeded north of the Haine by Nimy, and, taking

advantage of the woods of St. Denis to mask his dispositions, passed the Haine near Obourg at two in the morning of the 6th.

To this the following footnote is added:

To convey an idea of the extraordinary rapidity of this march, we compute the distance from the camp of Orchies to Brissoeul 5 leagues; to Siraut 4; to Havre 6; the Brabant leagues being about  $3\frac{1}{2}$  miles each, 15 leagues amount to  $52\frac{1}{2}$  English miles, which the Prince of Hesse performed in 56 hours, through bad roads and in a rainy season. Milner observes that they scarcely halted in the whole course of the march.

In order to reinforce Wellington at the battle of Talavera, the 43d, 52d and 95th Regiments, forming the Light Division under Crawford, made a forced march in July, 1809, of 62 miles in twenty-six hours (equal to 57 miles in one day), and each of the men carried a weight of between 50 and 60 pounds. In regard to this march, Colonel Napier, in his "History of the War in the Peninsula," says:

That day [July 29, 1809] Robert Crawford reached the English camp with the forty-third, fifty-second and ninety-fifth regiments, and immediately took charge of the outposts. Those troops had been, after a march of 20 miles, huddled near Malpartida de Plasencia when the alarm caused by the Spanish fugitives spread to that part; Crawford, fearing for the army, allowed only a few hours' rest, and then withdrawing about fifty of the weakest from the ranks, recommenced his march with a resolution not to halt until the field of battle was reached. As the brigade advanced crowds of the runaways were met with, not all Spaniards, but all propagating the vilest falsehoods: "*the army was defeated*"—"Sir Arthur Wellesley was killed"—"*the French was only a few miles distant*"; nay, some, blinded by their fears, pretended to point out the enemy's advanced posts on the nearest hills. Indignant at the shameful scene, the troops hastened rather than slackened their impetuous pace, and leaving only seventeen stragglers behind, in twenty-six hours crossed the field of battle in a close and compact body; having in that time passed over 62 English miles in the hottest season of the year, each man carrying from 50 to 60 pounds of weight upon his shoulders. Had the historian Gibbon known of such a march, he would have spared his sneer about the delicacy of modern soldiers!

In talking to Surgeon General Longmore of the march described in the preceding paragraph, Lord Clyde stated that he saw the men march in, and that they only carried a shirt and a spare pair of either boots or soles; and it is also stated by a writer that during the Peninsular war the men carried bags weighing about 2 pounds, and not framed packs and that their kits were very scanty. In referring to this extraordinary march, Dr. Parkes says: "It is so excessive (2.38 miles every hour, without reckoning halts) that it may be doubted if the distance was properly reckoned." Sir Wm. Cope, one of the officers of the 95th, in his "History of the Rifle Brigade," says that the distance was only forty miles.

Concerning marches during war, Dr. Parkes also says:

At times the fatigue undergone by trained men has been something almost incredible. Wolfe mentions in one of his letters that in 1743, just before the battle of Dellingen, his regiment marched from Frankfort "two days and two nights with only nine or ten hours' halt." This would be a march of thirty-eight hours out of forty-eight. He gives the distance at about 40 miles, but it was probably more. . . . A march of a small party of French was narrated by an officer of the party, who was afterward wounded at Sedan, to Dr. Frank. A company of a regiment of Chasseurs of Macmahon's army, after being on grand guard, without shelter or fire, during the rainy night of the 5th-6th of August, 1870, started at three in the morning to join its regiment in retreat on Niederbronn, after the battle of Weissenburg. It arrived at this village at 3.30 in the afternoon and started again for Phalsbourg at six o'clock. The road was across the hills, and along forest tracts, which were very difficult for troops. It arrived at Phalsbourg at 8.30 o'clock in the evening of the next day. The men had, therefore, marched part of the night of the 5th-6th of August, the day of the 6th, the night of the 6th-7th, and day of the 7th till 8.30 p.m. The halts were eight minutes every hour, from 3.30 to 6, one hour in the night of the 6th-7th, and  $2\frac{1}{2}$  hours on the 7th. Altogether, including the halts, the march lasted  $41\frac{1}{2}$  hours, and the men must have been actually on their feet about thirty hours, in addition to the guard duty on the night before the march.

It is stated by a well-known writer that Napoleon accomplished 300 miles in ten days when retreating from Moscow. Such a rapid march of the Grand Army was most extraordinary, as at one period of the memorable retreat the thermometer registered as low as 36 degrees below zero, Fahrenheit, and the roads were found covered with ice. Says Abbott:

At midnight [Nov. 5, 1812] a furious snowstorm set in, extinguishing the fires of the bivouacs, and covering houseless troops in cheerless drifts. . . . The troops, blinded and bewildered by the whirlwinds of sleet, staggered along, not knowing whither they were going. The wind drove the snow into the soldiers' faces and penetrated their thin and tattered clothing. Their breath froze and hung in icicles from their beards. Their limbs were chilled and stiffened. . . . Many, stumbling over a stone, or falling into concealed cavities by the wayside, were unable to rise again, and were soon covered with a winding sheet of snow; a small white hillock marked their cold graves. . . . The muskets dropped from the benumbed hands of the soldiers, while many had their hands frozen to their weapons of war. Flocks of ravens, emerging from the forest, mingled their shrieks with the uproar of the elements, and, with bloody fangs, tore the flesh of the prostrate soldier almost before life was extinct. . . .

To add to the horrors of the scene, clouds of Cossacks hovered around the freezing host, making frequent attacks. These barbarians stripped the wounded and the dying, cut them with their sabres, goaded them



with their bayonets, and with shouts of laughter derided them as they reeled and staggered in convulsive agonies, expiring naked in the snow. . . . There was no shelter. There was no dry wood to kindle a fire. The storm still raged with pitiless fury. One wide expanse of snow spread everywhere. The wretched soldiers, supperless and freezing, threw themselves upon the drifts, from which thousands never arose. . . . The horses perished as rapidly as the men. The soldiers stripped off the reeking skins of the horses as they fell, and used them as cloaks for protection against the storm. Many horses were killed, that the perishing soldiers might obtain a little nutriment by drinking their warm blood. . . . Circular ranges of the soldiers, stiff in death, and covered with the drifted snow, marked the site of the bivouacs. Thousands of snowy mounds, scattered over the plain, showed where during the night, horses and men had perished, while the storm had wrapped rudely around them their winding sheets. . . .

The horses, with their shoes worn smooth, or lost from their feet, continually fell beneath their riders. With incredible toil, the men were obliged to drag the cannon and baggage wagons up the icy hills. Frequently, in the darkness, men, horses, and artillery were rolling down the slippery declivities together. The cannon balls and the grape-shot of the enemy were often at the same time plowing their ranks. The days were short; the nights were long and dreadful. The sufferings of the wounded were awful beyond description.

"Let those who are emulous of the glory which war brings, contemplate the following spectacle, described by an eye-witness at Berlin," says a noted historian:

On Sunday forenoon last I went to one of the gates, and found a crowd collected around a car, in which some wounded soldiers had just returned from Russia. No grenade or grape could have so disfigured them as I beheld them, the victims of the cold. One of them had lost the joints of all his ten fingers, and he showed us the stumps. Another looked as if he had been in the hands of the Turks—he wanted both ears and nose. More horrible was the look of a third, whose eyes had been frozen; the eyelids hung down rotting; the globes of the eyes were burst and protruding from their sockets. It was awfully hideous. But a spectacle more horrible was to present itself. Out of the straw in the bottom of the car I now beheld a figure creep painfully, which one could scarcely believe to be a human being, so wild and distorted were the features. The lips were rotted away, the teeth stood exposed. He pulled the cloth from before his mouth and grinned on us like a death's head. Then he burst into wild laughter, gave the word of command in broken French, with a voice more like the bark of a dog than anything human, and we saw that the wretch was mad—mad from a frozen brain!<sup>2</sup>

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<sup>2</sup> Forster to Korner, January 14, 1814.

## AN ARMY HISTO-PATHOLOGICAL SERVICE

BY MAJOR GEORGE R. CALLENDER AND MAJOR JAMES F. COUPAL

*Medical Corps, United States Army*

(With six illustrations)

THE PURPOSE of these notes is to remind the readers of THE MILITARY SURGEON of the course which medicine has followed in reaching the progress of the present day, and to bring to their attention that fundamental science on which all of this progress has been based. We have gradually become dominated with the parasitic idea which, up to within the last decade, has reigned supreme and still controls the thoughts and actions of by far the greatest number of our profession. We must not, however, lose sight of its relative value in the scheme of the study of disease, as otherwise we are unable to properly evaluate the steps being taken in the present. We would remind you that pathology is that biological science which treats of diseases in the human body. Medicine is the art by which that science is applied to diseases. Etiology is a branch of the science of pathology and parasitology again a branch of etiology. These special branches have gradually reached an importance which requires the entire time and energies of an individual in order to be competent to cover these divisions in the great field of pathology, and too frequently the parasitologist confines himself so entirely to the biological characteristics of organisms that he forgets or neglects the actual lesions they produce.

In handling a patient it is rapidly being considered sufficient in many instances and in many places to have each and every laboratory examination performed from urine to basal metabolism, thereby establishing a diagnosis without recourse to clinical observations, without much work on the part of the clinician and with practically no thought at all to the pathology present. This is a very shallow way of practicing medicine, but we are happy to say that recent work in chemistry has brought some stimulation back to the consideration of pathology, though in too many of our clinics it has simply added another procedure on to the laboratory and just one other opportunity for the clinician to make a diagnosis without looking at the patient. It is time that doctors of medicine know what the tissues look like when given symptoms or symptom complexes are present. Until that time they are practicing empiricism and can claim no place in the art of medicine.

All biological sciences deal with the processes of life. These are intimately connected and dependent upon each other and are so variable

that strict limitations and separations are impossible. Processes of life defy strict classification, but at the autopsy table we can begin to classify, though we must keep constantly in mind that our methods of procedure and study are the ones of our day and generation only, and that they are subject to advancement and to greater perfection which causes any classification to be continually modified.

Following the ascendancy of pathology under the leadership of Virchow, we come to the period of dominance of parasitology under the leadership of Pasteur, Koch and others. This threw morphological pathology into the background from which it is only now beginning to emerge. This stagnation in pathology has its counterpart in earlier days. Hippocrates in 460 B.C. and Galen in 200 A.D. taught the so-called "humoral" pathology the adherence to which, combined with the conception during the early periods of Christian domination that bodily ills were due to the presence of devils and demons, was responsible for the lack of progress in medicine up to the sixteenth century. The body was looked upon as the property of the devil and treatment consisted largely of exorcism—the driving out of malignant spirits and demons. The church prevented investigations by means of autopsies, etc., thereby preventing an increase of our knowledge of anatomy and pathology. Virchow's name is the outstanding one in the era of progress in pathological knowledge and he represents the apex of effort begun late in the eighteenth century under the leadership of Baily, Bright, Addison, Hodgkin and Laennec. Just as they in those early days allowed the study of the science of disease to be thrown in the background, so we today have by extensive work on etiology allowed the fundamental principles of pathological change to be all but forgotten. This is in part due to the fact that, while we were able to describe the picture of pathological processes, we were unable to account for the chemistry of the changes concerned. The physico-chemists in their endeavor to establish life or living substances by means of physico-chemical processes have given us a much better understanding of the chemistry which gives rise to morphological changes, and it becomes increasingly evident that to be considered as qualified in the science of disease we must study and understand all morbid processes to a far greater degree than at present obtains.

One acquires skill and knowledge in this by practical experience combined with a careful study of the work of others in this field. Practical experience can be obtained only by the examination of tissues as found at the autopsy table, or as removed during operation. Yet in our service today how few of the possible autopsies are done and, when done, how meagerly they are attended and how poorly is the material

finally worked up. During the recent war serious obstacles were placed in the way of pathologists so that the percentage of autopsies fell from our pre-war rates of nearly 100 to a very insignificant number. The result was that an enormous quantity of valuable material was lost. These obstacles did not obtain to such a degree in our expeditionary forces, with the result that an enormous amount of valuable material was obtained which will form the basis of our teaching for many years to come in the methods of handling the diseases which cause inefficiency in our fighting forces. Where scientific material can be obtained and where our knowledge can be increased without detriment to our fellow-men, no opportunity should be lost in taking advantage of it. Only by autopsy can we obtain the definite knowledge of the process causing death. Where it is necessary to obtain permission to do autopsies it is usually not difficult to obtain it provided one approaches those concerned in a proper manner. It is the lazy or tactless man who does not get autopsies. The best hospitals in our country have the highest autopsy percentages. One of the best-known clinics of this country has practically 100 per cent of autopsies and even has many cases brought in to the hospital only for autopsy from the surrounding country. We must educate the laity to the benefits to be obtained for themselves and posterity by the study of the human body.

Army Regulations 40-410, Par. 20, enables the Medical Department to keep a permanent file of autopsy records. This is with a view to stimulating the doing of autopsies and to properly coordinate the work so that the most value may be obtained therefrom for the entire service. It is hoped that in the filing of these records a full picture will be presented in each case of the processes involved, including adequate clinical notes and sufficient description to make the pathology of the condition clear.

The Medical Department of the Army has now organized an adequate service for properly handling gross and microscopical pathology, and it may not be amiss to outline this organization. In the first place, no medical officer of the Army should lose any opportunity to perform a post-mortem examination. The knowledge required to make such examinations is not so great that it should make any man hesitate to perform this purely technical procedure. The descriptions of diseased organs carefully made, even by those not well versed in the language of the autopsy table, cannot fail to have a considerable value to those who read them and study the microscopical sections. The Army Medical Museum is prepared to handle all histological material, either doing all the work on the fixed blocks of tissue or verifying such diagnoses as may have been made at the post where the autopsies are done. No



criticisms will be made of the officers sending in reports except that where additional data are desired to clarify the conditions the same will be requested. It is urged on all medical officers that they do as many autopsies as possible, that as many gross specimens of pathological conditions, even the more usual findings, be sent in to the Army Medical Museum to accompany the protocols; that histological blocks be made on tissues and that these, too, be sent in for confirmation or to add to the material to be studied in connection with the written record.

Many unusual conditions are presented to this service for diagnosis and practically the entire group of the more prominent pathologists of this country have cooperated to a greater or lesser extent during the past three years in studying these unusual conditions and in giving the benefit of their wide experience in those borderline cases where consultation was deemed desirable. This cooperation has been most valuable and is highly appreciated.

The following case reports of three unusual conditions are presented to show the amount of interesting material which passes through our pathological service in a relatively short time, all three of these cases having come to autopsy within a period of one month.

#### PRIMARY CARCINOMA OF THE LUNG

Accession No. 17979. E. H., aged 71 years. (Fig I.)

*Clinical History.*—Entered the hospital October 27, 1921, complaining of pain in chest, dyspnoea and severe cough. X-ray examination November 24, showed either consolidation or fluid in the right chest. Urine showed albumen and casts. Chest was aspirated December 16 and 145 c.c. of thick, greenish pus was removed. Pneumococcus not typed in the pus.

*Post-mortem Examination.*—*Thorax.*—The lungs are voluminous. Left lung is free. Right lung is adherent by delicate fibrous adhesions anteriorly and superiorly except at the apex. Adhesions become more dense toward the lower portions of the lung where it becomes necessary to strip the parietal pleura in order to remove it. The left lung is air containing throughout. There is some increase in the amount of fluid in the dependent portions. The right lung is voluminous and air containing in the upper portion, the base of the lung being rather firmly consolidated. On section the lower half of the lung is compressed by an encapsulated pleurisy which measures 12 by 8 cm. The lower third of the lower lobe as compressed by this fluid is necrotic. This necrotic mass shows a red and yellowish-grey mottling which extends upward into the upper lobe, while the necrotic area in the lower lobe shows the characteristics of a confluent necrotic bronchopneumonia. This bronchopneumonia extends to within 2 cm. of the new growth which encircles the inferior primary bronchus about 3 cm. from the bifurcation. This infection probably started because of the occlusion of this bronchus by the tumor and consequent retention of this fluid and infectious material

below the obstruction. The lymph nodes draining this area are all enlarged, pale and opaque and are largest in the area of the pleura nearest the spine. The consolidated area in the lower lobe of the lung shows many necrotic zones, all of which exude pus on pressure.

Histological examination revealed a carcinoma arising from the right inferior bronchus consisting of columnar epithelium disposed in papillary-like masses on small amount of stroma.

#### PRIMARY CARCINOMA OF THE LUNG

Accession No. 18086. B. D., aged 48 years. (Fig II.)

*Clinical History.*—Has had indefinite pulmonary symptoms for several years. Mental condition has been hazy for the last year, or since returning from duty in France. In June, 1921, after a rather heavy strain, felt a sharp pain beneath the right clavicle and a little later expectorated a small blood clot and some red sputum. X-ray examinations in August showed indefinite consolidations in the right lung. During the latter part of his disease had an acute exacerbation with temperature and *Pneumococcus* Type III was isolated from sputum. This patient had occasional attacks of acute inflammatory reaction of the lung from the time of first observation for this condition until his death on January 16, 1922, a period of approximately six months. Previous to that his symptoms had been largely of a mental character and the autopsy findings were entirely unexpected.

*Autopsy*—by R. E. Scott, Major, M.C.

Permission only for examination of the chest was given. The right lung showed a few small bronchopneumonic areas, the left lung showed a necrotic confluent bronchopneumonia of the upper third of the upper lobe. The remainder of this lobe showed an irregular necrotic white mass occupying all but the lower 2 cm. which showed the same type of bronchopneumonia found in the apex. Small miliary nodules extended out into the uninvolved lung at the periphery of the tumor.

Histological examination showed an adenocarcinoma, the type cell of which is that of the bronchial mucosa which is infiltrating by way of lymphatics sometimes even appearing to extend along air passages.

These cases are presented to add to the number of reported cases of primary carcinoma of the lung.

#### EMBRYOMA OF RIGHT BRANCHIAL CLEFT

Accession No. 18102. R. M., aged 45, enlisted man, U. S. Army. (Fig III.)

*Clinical History.*—In the summer of 1920, following an apical infection in two teeth, patient noticed that the region of his parotid gland was swollen and tender. In June, 1921, there was a recurrence of the swelling accompanied by a swelling of the deep nodes on the right side of the neck. After that time he was kept under observation, the enlargement extending to the subclavicular glands and the whole area became painful and tender. In August, 1921, he was admitted for further observation and treatment. His weight at this time was 180 pounds. General condition good. Right parotid and right cervical

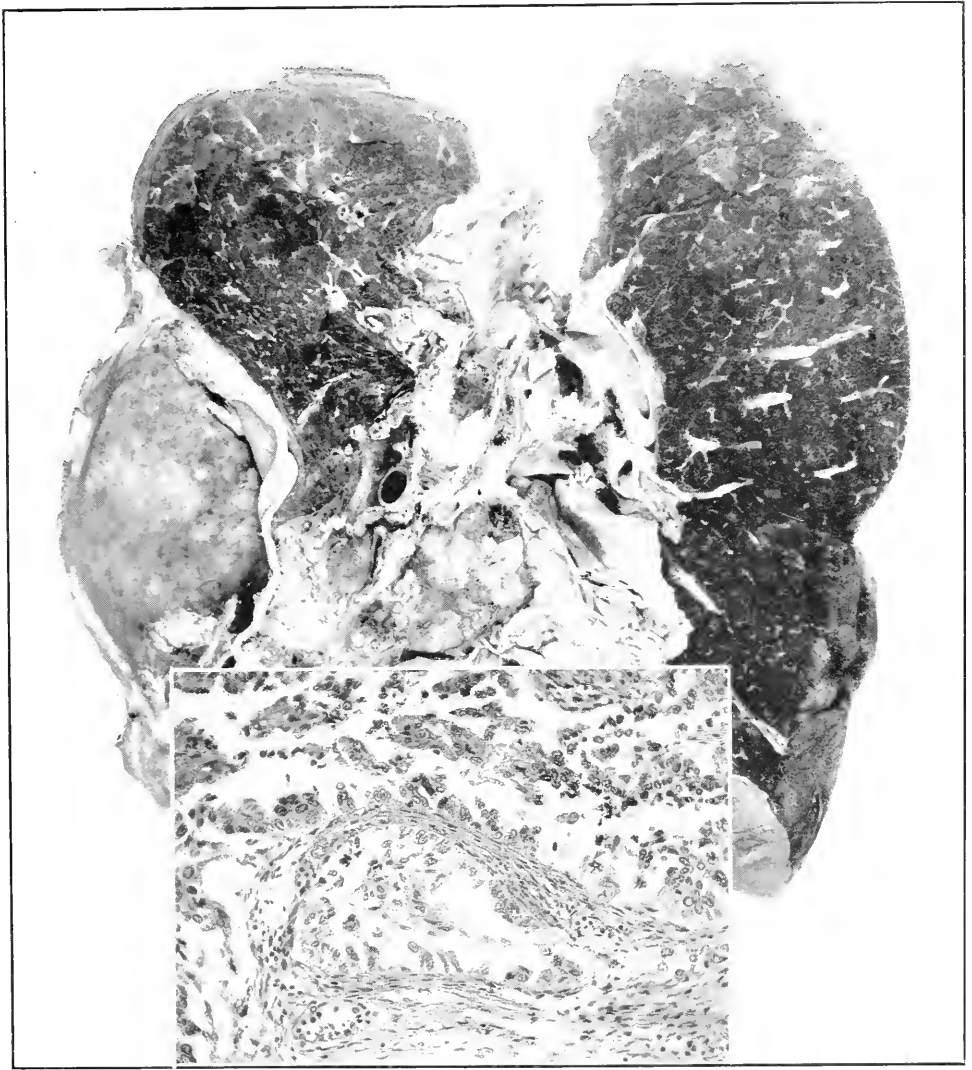


FIG. I.—Gross picture shows new growth encircling the inferior primary bronchus 3 cm. from its bifurcation. The lobe supplied by this bronchus shows a necrotic bronchopneumonia and an encapsulated empyema. The insert shows the columnar type of cells taken with a 1.7 A. Oil Immersion Leitz Objective and an 8 Periplane Leitz Ocular. The bellows of the camera was extended 90 mm. This has been reduced about three times in reproducing.

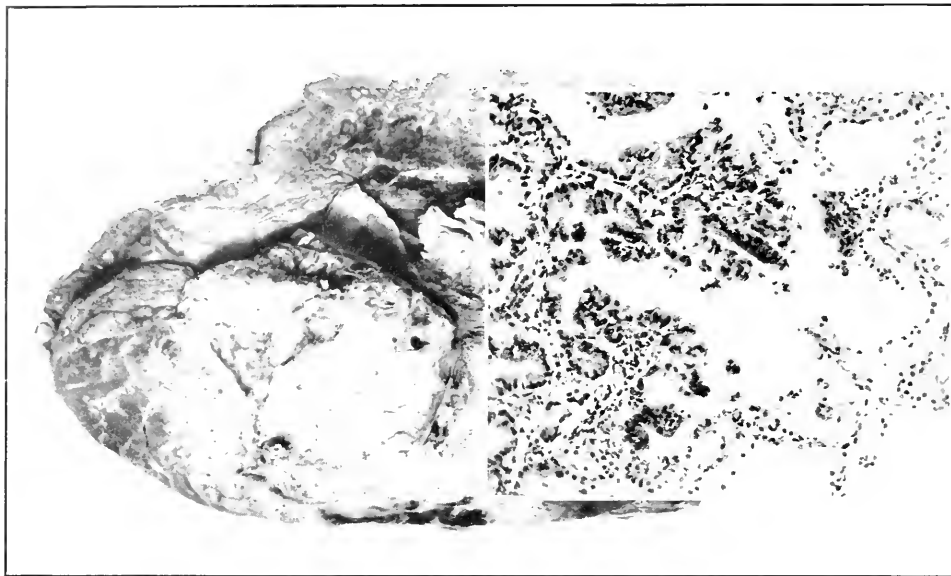


FIG. 11. The gross picture shows a lobulated tumor surrounded by areas of bronchiopneumonia occupying the lower three-fourths of the upper lobe of the left lung. The insert shows the columnar type of cell in the tumor taken with a 1.7 A. Oil Immersion Leitz Objective and an 8 Periplane Leitz Ocular. The bellows of the camera was extended 90 mm. This has been reduced about three times in reproducing.

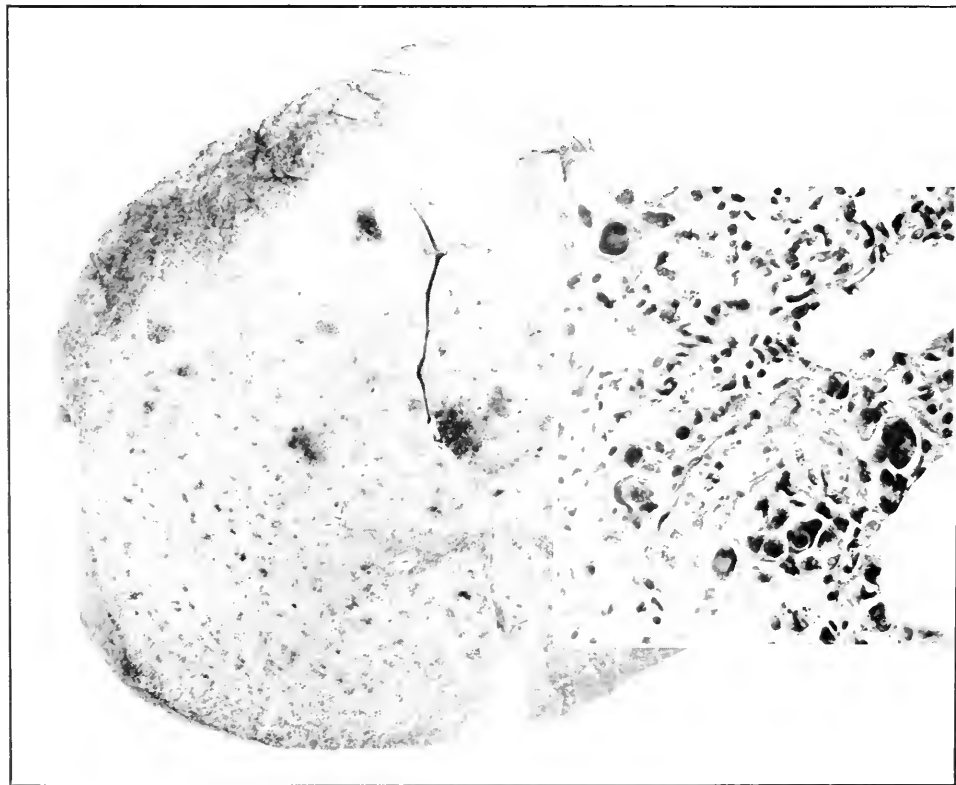


FIG. 111. The gross picture resembles an extensive lobular pneumonia in grey hepatization. The insert shows the embryonic type of cells and is taken with a 1.7 A. Oil Immersion Leitz Objective and 8 Periplane Leitz Ocular. The bellows of the camera was extended 90 mm. This has been reduced about three times in reproducing.

and clavicular nodes swollen and tender. The adenopathy most of the time was painless and did not appear to be attached to the skin. Toward the latter part of his life it did become attached to the skin and surrounded by considerable induration. The facial nerve was involved during the latter part of the illness with characteristic symptoms. A small portion of the node was excised October 4, 1921, the diagnosis at that time being mixed cell sarcoma of embryonic type. Patient became cachectic as result of the toxemia, gradually lost weight and died January 27, 1922.

*Autopsy*—by R. E. Scott, Major, M.C.

*External Appearances.*—There are numerous hemorrhages from small petechiae to areas  $1\frac{1}{2}$  inches in diameter scattered over the body. There is a tumor mass extending from the mastoid process to the sterno-clavicular articulation about 5 cm. in width. Under section the tumor involves the parotid gland, extends along the vessels of the neck and into the mediastinum. A small projection of the tumor is seen in the internal jugular vein. The mass is roughly lobulated, hemorrhagic in places and tends to break down and soften.

*Thorax.*—The left lung weighs 710 grams, is heavy and contains many small nodules and some confluent areas. These nodules are firm, translucent, and greyish-red in color. The right lung weighs 880 grams. The entire structure appears homogeneous with the exception of the lower portion of the lower lobe where some air containing tissue is present. Color is a greyish-red and translucent. Aside from this translucency, tissue resembles a beginning stage of grey hepatization in lobar pneumonia. There are also miliary metastases in the liver and spleen.

Histologically, tumor consists of large cells without regular arrangement forming very few vascular channels. Type cell is an oval or polygonal cell which, apparently due to pressure conditions, forms many odd shapes. Recently formed cells are more nearly spherical with oval vesicular nuclei eccentrically placed. They increase in size and sometimes form a syncytial-like mass. They appear to spread along lymphatics and lymph spaces after they once reach an organ. Metastasis, however, seems to have been only by the blood stream. In the lung they were apparently metastatic by very small masses or individual cells as the entire tissue of the right lung was infiltrated, practically every alveolar wall being choked with these cells.

This tumor is of an undifferentiated cell type arising in the region of the right branchial cleft and probably started from an embryonic cell "rest." The case is presented as one of undifferentiated cell which has particular interest because of the method of metastasis and the gross appearance of the tissue of the lung as result of such metastasis.

#### A DIFFERENTIAL STAIN FOR NERVE FIBERS

By HELENOR CAMPBELL, *Microscopist, Army Medical Museum*

The following impregnation method for medullated and non-medullated nerve fibers has the advantage of allowing a counterstain for the differentiation of other tissue elements. It has been found satisfactory

in staining the fibers of both the central nervous system and peripheral nerves.

1. Fix pieces of tissue not over 3 mm. thick for 3 hours in Carnoy's fluid:

Absolute alcohol.....	6 parts
Chloroform.....	3 parts
Glacial acetic acid.....	1 part

2. Wash in several changes of absolute alcohol for twenty-four hours.
3. Fifty per cent alcohol for six hours.
4. Ammoniated 50 per cent alcohol (5 drops of ammonium hydrate to 50 c.c. of 50 per cent alcohol) for twenty-four hours.
5. Rinse quickly in distilled water.
6. Impregnate in a 2 per cent aqueous solution of silver nitrate for five days.

7. Wash in frequently changed distilled water for one to two hours.

8. Reduce for twenty-four hours in the following solution:

Hydroquinone.....	1 gm.
Distilled water.....	100 cc.
Neutral 40 per cent formaldehyde.....	15 cc.

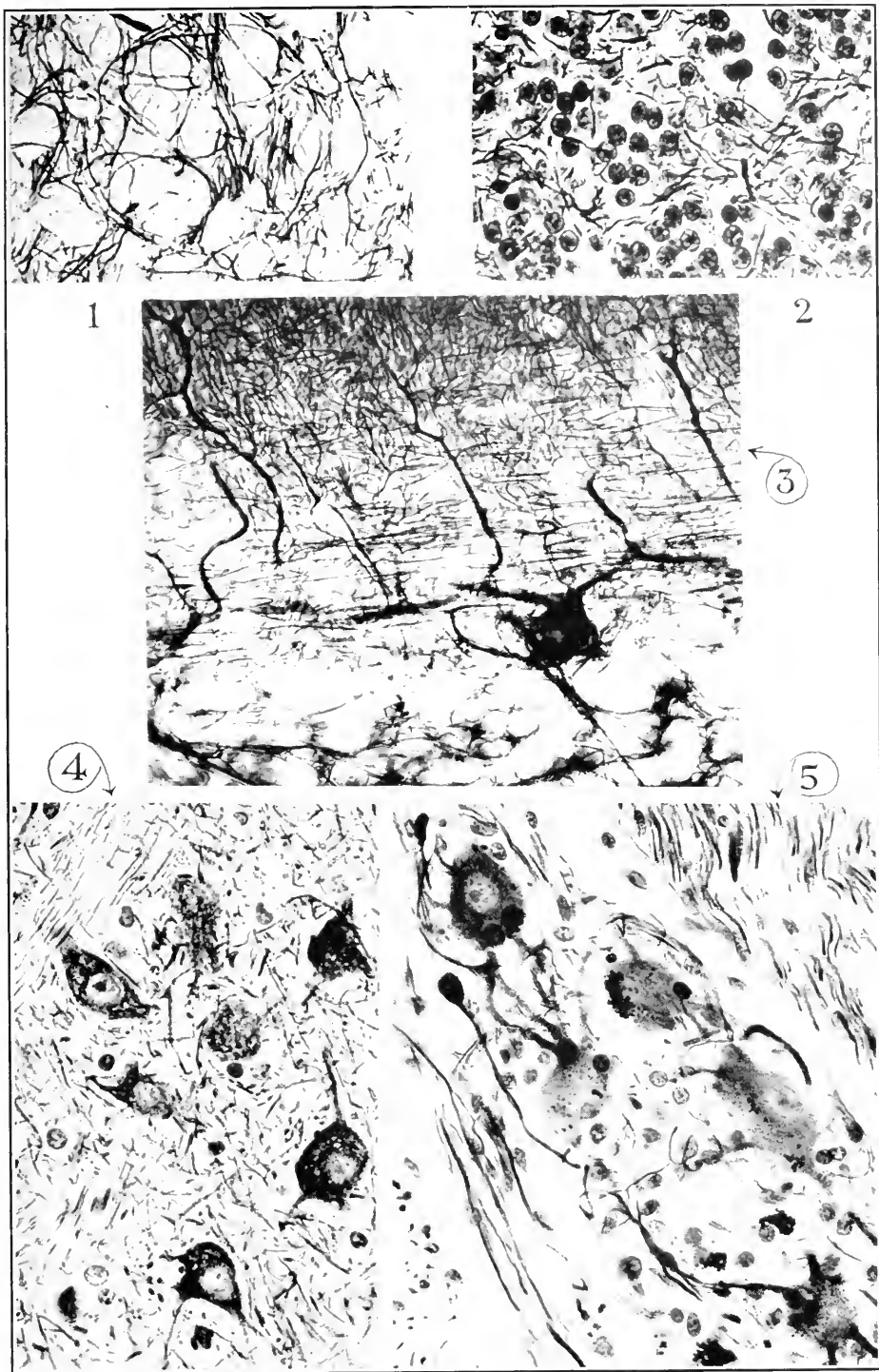
9. Wash in frequently changed distilled water for two to three hours.

10. Place in 80 per cent alcohol.

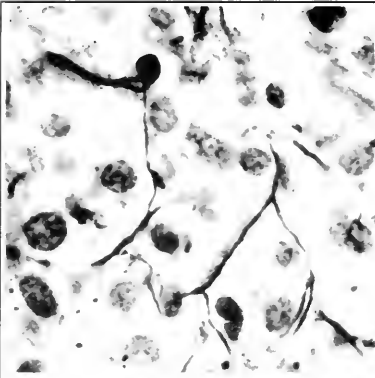
Steps 6, 7 and 8 should be carried out in the dark at 37° C. and step 9 in the dark at room temperature. The Carnoy's fluid, silver solution and reducing solution should be freshly made up. It is essential to have clean glass ware and to use distilled water throughout.

After the tissue has been dehydrated, imbedded and cut according to the usual paraffin technique it may be counterstained with hematoxylin and eosin, and mounted in balsam.

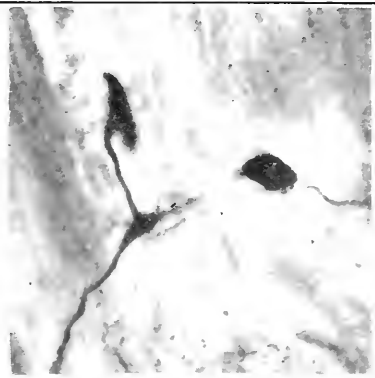
Nerve cells stain brown, their nuclei blue and their processes black. Nonmedullated fibers stain intensely black and medullated fibers brownish-black. The medullary sheath appears as a yellow segmented cylinder surrounding its darker axon. Where a neurolemma is present its oval blue nuclei are easily distinguishable lying along the axis cylinder or the medullary sheath. Muscle stains yellow or brown. Connective tissue reacts according to the age of its fibers. Thus elastic tissue stains pink in young fibers to black and granular in old fibers, and white fibrous connective tissue pink to yellowish-brown. All other cytoplasm, remaining unaffected by the silver impregnation, retains its acidophilic properties and stains pink. All nuclei, independent of the degree of silver precipitation in the tissue surrounding them, stain a clear blue.



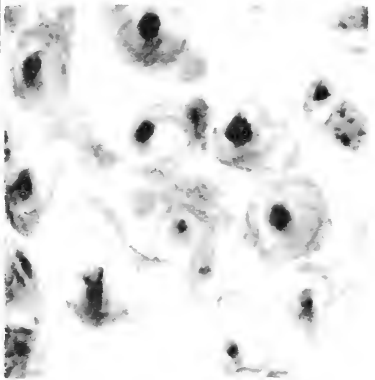
1. Cerebellum. Fibers of the granular layer without counterstain.
2. The same with haematoxylin and eosin counterstain.
3. Purkinje cell from cerebellar cortex without counterstain.
4. Cerebral cortex.
5. Splanchnic ganglion. Ganglion cells, non-medullated fibers, end plates and connective tissue nuclei.



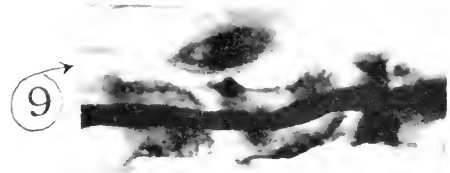
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6. Adrenal. Nerve fibers and end plate in the medulla.

7. Nerve endings in the Bundle of His.

8. Transverse section of medullated nerve fibers.

9. Longitudinal section of a medullated fiber showing the myelin sheath and a neurolemma nucleus.

10. Recurrent fiber from an amputation neuroma.

11. Non-medullated fibers and proliferated neurolemma from an amputation neuroma.

12. Bundles of non-medullated fibers and proliferated neurolemma from the distal end of an amputation neuroma.



## THE POST LIBRARY<sup>1</sup>

BY COLONEL P. M. ASHBURN

*Medical Corps, United States Army*

WE HAVE here, as you know, a post library of considerable size, embracing some 1,500 books. For your further information I desire to say that the selection of books is good, though not by any means just the same as any one of us would have made for himself had the task been imposed upon him individually. But it is a good general selection and one in which individuals of many types and many tastes can find things of interest and of profit. Nevertheless the library is not much used, and one is led to ask "Why is a library?"

The obvious answer to that is that a library is a place in which one may obtain or consult books. But few of us seem to regard our post library in that light. Is it because we definitely dislike books or that we merely do not get pleasure or profit from their use—do not regard them so highly as to find them worth the time and thought which their reading requires? I think that the answer requires some thought.

There is a certain class of books in our library, principally what we may designate as light fiction, which shows much usage. The loose and dingy bindings, the dog-eared, loosened and soiled pages all tell of much handling. In general these books may be said to cheer but not inebriate, to occupy the mind without causing it to work, to enable time to pass without thought. It is not my purpose or intent to say that they should never be read or to intimate that we should never be willing to help time pass without thought. The world might be much too serious if we tried that. But it might be worth our while to have an occasional thought, and I suggest that it would not prove destructive to happiness.

On the other hand, there is another class of books which shows little use—some of them none. I refer to the books on technical subjects, such as agriculture and trades and professions. It is easy enough to understand why these are not generally read, as they cannot be expected to put forth a strong call to many people other than those who work with and have need of the technical knowledge in their business or callings. It is natural that a doctor should be interested in medical books and a lawyer in legal treatises, that an automobile mechanic should be interested in works on the gas engine and the dairy farmer in those dealing with the breeding or feeding of dairy cattle, but we regard it as a natural and not surprising thing if none of these read the technical works which most interest the others.

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<sup>1</sup>A lecture to the enlisted men at the Medical Field Service School, Carlisle Barracks, Pa.

But between these two classes of books, the use-worn time killers and the little used technical volumes, stand the larger number of books in our library. They are books dealing with a wonderful variety of subjects, with all that has interested and occupied the thoughts of men; with history, poetry, imagination, travel, experience, governments; with wars and the causes of wars; with art and the influence thereof; with natural phenomena and their manifestations and causes; with gods and heroes, demons and villains; with heaven and hell and the earth between. Without being too critical or exclusive or attempting to draw too fine definitions, we may say that these books are literature, and, without in any way stretching the truth, we can say that their appearance does not indicate that they are in danger of speedy destruction through use. In other words, literature does not seem to be popular in our post, if we may judge from post library use. I doubt if our post is exceptional in this, and I believe that literature is generally not popular. Why? There may be several reasons, and it is probable that some of them have not occurred to me, but I believe that the reasons which keep most people from good literature are two—lack of introduction and misconception of the nature of literature and, therefore, lack of desire for introduction or lack of ease and open mindedness when an introduction is effected.

Let us personify literature for a moment and say that it is a group of men, ex-Presidents Wilson and Roosevelt, William Shakespeare and Saint Luke, all persons of whom we have heard and all "literary men." What do we think of them as individuals and personalities, apart from politics as regards the first two. Frankly we do not know what we think of them. Why? First of all because we have not met them personally. But suppose it were possible for us to meet them personally, that we could spend an afternoon with them or eat dinner with them, what would be our attitude? Should we not be apt to feel ill at ease, self-conscious, embarrassed? Of course we should. Why? Because we think of them as set apart from us by their greatness, as thinking great thoughts and expressing them in language not ours. The chances are that we should think of Mr. Wilson as a cold man, a "highbrow," and not be at all able to see the considerate, cheerful, good friend and story-teller of whom Mr. Tumulty has written. Mr. Roosevelt we should picture as an eccentric but great man, whose aspect presents mainly a view of spectacles and teeth, and vigorous action and words of approval or disapproval, and we should miss entirely the Theodore Roosevelt whose letters to his children show him so loving and so lovable. Shakespeare would be a severe looking man in pointed beard and Elizabethan dress whose reputation for exalted thought and beautiful

language would make it seem impossible that he could approach or be interested in such poor creatures as we, and we should forget that he knew and delighted in such characters as Sir John Falstaff and Dogberry. Saint Luke would, by his very saintship, be outside of our world and would seem more like a character from a stained glass window than like a man of flesh and blood who practiced medicine in the fashion of his day and had his being with the poor, the infirm and the afflicted, or than the story teller who could write a plain tale so interestingly and understandably as he wrote his Gospel or the Acts of the Apostles.

None of them would have seemed just in our class, and our afternoon or our dinner, the opportunity of a lifetime for great association and the formation of friendships with the great, would be spoiled, because of our mental attitude. I feel sure of this because I feel sure of what my own rotten attitude would be and because I have brought before me daily the fact that you are ill at ease when you come before me, are not yourselves and not comfortable, and this just because I, by the circumstance of military rank and not because of any greatness or shadow of greatness, am placed above you in this small post. But suppose that you had been introduced to Wilson, Roosevelt, Shakespeare or Saint Luke in childhood. Suppose you had grown up with him, gone to school with him, fought and played with him. The chances are that you would wonder at the world seeing so much greatness in him and that you would often say to yourself, "He is just such a dub as I am, a very ordinary person; I used to lick him and I stood ahead of him in school. He used to be a roughneck (or a dude, as the case might be) and in spite of all the world says of his rectitude, I remember when he stole apples, and he would have been arrested once if I had not shielded him by keeping quiet." And that might be true, too, but it would not affect the fact that he had greatness in him and that he is great. It would affect your feeling of self-consciousness in his presence, it would enable you to eat your dinner at ease with him, and it might enable you to come to a truer appreciation of him. Not only is it necessary that we be introduced to a man but, if we are to be at ease with him and understand him, it is necessary that we be introduced to him on a plane of more or less equality, that we summer and winter with him for a while, that we learn something of his personality, of his human strength and weakness. Preferably our introduction to him should have been in childhood. Then we could at least intelligently and reasonably like or dislike him, find him pleasant or unpleasant, regard him as great or small. We should not, at any rate, be forced to look at him across a great gulf of imaginary water from which come such chill winds as to make us wish to get no closer to him. Then we could read his writings and feel

justified in criticizing them, and in the reading and criticizing we could get pleasure. I suggest that our attitude toward literature is much like the attitude we would unconsciously and unwillingly assume when invited to make a fifth at dinner with Wilson, Roosevelt, Shakespeare and Saint Luke. Had we met literature in our childhood and been its easy familiar, played with it, gone to school with it, wintered and summered with it, we should be at ease with it; we could sit down to a feast with it and enjoy the food, ourselves and the conversation and could go home at length either filled with admiration or wondering what the world could see so great in literature, but at any rate knowing that it was alive and real, that it was human, that it was companionable and, in all probability, that it was interesting. Truly it is all of these.

What is literature, that we can allege that it is alive and real, human, companionable and interesting? Is it not print, made in ink on paper, bound in boards or cloth or leather and set on shelves in libraries; where only scholars and "highbrows" go, and where the atmosphere is either too musty or too rarefied for comfortable breathing? It is not.

That is preeminently what literature is not. What it is is the reflection of life. Life as we know it is much the same as human thought. Literature is the cream of human thought, and without it only the skim-milk of thought remains. Who would live on skimmed milk alone if he could get cream either to eat alone or to mix with his skimmed milk, to enrich and strengthen it? Literature is in part the thoughts, and the best thoughts, of these four men we talked of, Wilson, Roosevelt, Shakespeare and Saint Luke, but it is much, much more. It is the best thoughts of all the great men of the world of whose thoughts we have any record. And when I say the best thoughts, I do not mean merely the most lofty thoughts; I mean also the most beautifully imaginative, the most instructing, the most interesting, and also the most amusing, the jolliest, the happiest and gayest. Boccacio, Cervantes, Rabelais and Mark Twain belong to literature just as much as do Dante, Shakespeare and Goethe; and Shakespeare made Sir John Falstaff, Mistress Quickly and Doll Tearsheet just as truly as he made Hamlet or Juliet. Bobbie Burns and James Whitcomb Riley were as truly poets as Milton or Tennyson, and if you have missed their writings because you were frightened by the word "poetry" you have missed much which you might greatly enjoy. You probably think that you know soldiers pretty well and that you enjoy their ways and their stories. But if the fear of "literature" has kept you from knowing Kipling's "Barrack Room Ballads" and his "Soldiers Three," or Dumas' "Three Musketeers," you have been kept from knowing some of the most amusing, rollicking and interesting soldiers the world has ever

seen. Even Charles O'Malley's friends and Tristram Shandy's Uncle Toby are cream in comparison with the soldiers you know.

In fact, don't you think that literature is "highbrow" and only for educated people? I believe that you do and that you are avoiding acquaintance with it for that reason. If that be your belief and your attitude, I am here to tell you that you are mistaken in both, and I speak as one having knowledge. Do not misunderstand me. I do not mean that I speak as one having exceptional knowledge of literature, as one highly educated in the sense which I fear you may attach to the word, as one at all qualified beyond the ordinary run of men to express an opinion about a person or thing I know. I mean merely that I speak of literature as one who met it early enough in life not to be scared by its name; as one who has summered and wintered with it in a casual way; as one who has found it occasionally as dirty and as nasty as a small boy; but also as one who knows that it is alive, that it is human, that it may be most wise, most delightfully entertaining and amusing, and that it is, on the whole, the cream of human thought; the most human as well as the best of story tellers; the most dependable of friends and often, not always, the most satisfying of companions. Knowing all that, I can unhesitatingly advise you to seek acquaintance with it.

But you may still object that literature is the affair of educated people and that you are not educated. To that I am obliged to reply that it is true that literature is known principally by well-educated people and that you—many of you, at any rate—are far from well educated. But what do we mean by "educated"? Volumes have been written on that subject, hundreds, possibly thousands of volumes, and learned doctors have disputed for centuries about it without reaching accord. So it may be that I don't know what it means, and that you are educated. Of one thing, however, I feel pretty sure; "educated" does not mean merely "passed through school" or "college graduate." But what does it mean? I cannot give you a definition which will satisfy everyone. I may not be able to give one which will satisfy anybody, even myself. No man can be so educated as to have all knowledge. No man can be so educated as to be superior to all weakness or frailty. No man can be so educated that his judgment is always infallible. No man can be so educated that he is always happy. What is "educated"? The word is compounded from two Latin words, *e* or *ex*, meaning out, and *ducere*, to lead. Going back, then, to those old words of origin, and seeking the meaning of the word there, we might say that the educated man is a led-out man. But what is he led out of and where is he led to? I hazard the guess that each step that he is led

out from the state of ignorance and helplessness into which he is born is education, and that each step which increases his knowledge, his strength, his skill, which makes him able to live in greater safety, greater self-reliance, greater peace and greater comfort and better relations with his fellows is education; that everything which develops an old or new aptitude in him, which puts him into closer harmony with the world in which he lives, is education. If this be true, then every one of you is, if not an educated man, at least in the way of becoming educated. The narrower conception of education, that it is a state resulting from study of textbooks, from instruction in schools, is too narrow. That sort of education is not necessarily a fit playfellow for literature. It might even make a mistake and introduce one to pedantry and word worship instead of literature. It may not know literature at all well.

But education, even of the kind for which I tried to give a definition, may be good or bad. What is the difference? Here again we come to abstract terms which it is hard to define. What is considered good in one place or one time is thought bad at another place or time. When Jacob took the advantage of his brother Esau's hunger to cheat him out of his birthright, he did a thing which the Jews of Moses' day apparently regarded as highly moral and proper, a good act, but it was a thing which we should regard in this time and place as a scurvy trick, a bad act. When the Indians of Canada and New York tortured, scalped and burned the devoted Jesuit missionaries who were trying to christianize them, they performed deeds which were in their own eyes good, but in the eyes of our world, very bad. They did the thing their education caused them to regard as proper, just as the missionaries were doing what their education led them to. The Indians were, in a way, educated, and ~~but~~ if their education was good because it increased their knowledge of things they needed to know—woodcraft, hunting and fishing; it increased their strength and skill and enabled them to live in greater safety. It was bad, however, because it did not cause or enable them to live in peace or in better relation with their fellows. They lived in an almost perpetual state of warfare, which was probably a more important cause of their disappearance than was the white man's warfare against them, and they did such things to those who tried to help them as to cause the white men to have to take arms against them.

So, if I am to define good education and bad, I am inclined to say that such education as enables or causes a man to develop his greatest and best aptitudes, what puts him most into harmony with the world in which he lives, what leads him to love his neighbor as himself and to do to others as he would be done by, is good education. What does the opposite is bad.

With this understanding of education, I again affirm that each of you is at least in the way of becoming educated, and whether or not you have gone to school beyond the fourth grade matters relatively little. It is not only or mainly school teachers who educate. It is every contact you make with life, every person you meet and serve with, work with or play with, it is the towns you visit, the country and the cities you pass through, the seasons you live through, the things you see and hear and think and do, the life you lead. Education is life for an intelligent being, and life is education, or, if that be a little strong, we can at any rate say that life is full of education and education full of life.

But I have said that human life as we know it is almost the same as human thought, and that literature is the cream of human thought. Therefore literature is one of the greatest and best of educators and, furthermore, it is most needed by those who most need education. It is not the exclusive property or need of the college man. It is your need and mine. And it is your literature and mine if we choose to make it ours, if we will only allow ourselves to relax in its presence, to be amused, entertained, moved, edified, or uplifted by it. Why should we not do this? We should do it and we would do it if, as I said, we were once so introduced as to be on an easy footing with it. Let us seek such an introduction. How can we obtain it now if we did not have it in childhood? Let me tell you how I obtained an introduction to French literature. I went to France during the war and after the armistice I was stationed in Tours, where, like thousands of others there and elsewhere at that time, I had so many spare hours on my hands that, if I had devoted them to thinking only of home and my longings, I should have been very unhappy. So I decided to try and learn something of French and, as I had studied Latin, German and Spanish sufficiently to learn that grammars are apt to be mere sterile deserts in which a thirsty man may wander unhappily and often unprofitably, I decided to go in for speech and reading. My opportunities for speech were good, but I never did learn as readily through the ear as through the eye, so I did not get far that way, and my acquaintance with French is less than a good speaking acquaintance. But I was living in the house of an intelligent and kindly French woman who had quite a library of books which she had read herself, and quite a discriminating taste. She was so good as not only to lend me books but to recommend them. Fortunately, too, most of her books were old ones. Last summer Judge Davis talked to you here about books, and I remember that one thing he said was that he felt pretty sure, when a book had been in print for fifty years and was still read, that it was a good book. I don't know that

my French friend had applied any such rule, but at any rate most of her books would have passed the test. They were among the best in French literature. So I went at them, at first digging laboriously with pencil and dictionary, but the labor grew progressively less, and when, after a few months, I was ordered home, I was able to read French with great pleasure. Strange as it may seem to you, I found it easier to read the great masters of French prose than to read the French newspapers, and infinitely more interesting. I can truly say that the greatest thing I, a professional soldier and medical man, got out of the World War was an introduction to French literature, and by that introduction I gained a companion that promises to interest, amuse and instruct me as long as I live. There is not a man of you here who is not better prepared to undertake acquaintance with English literature than I was for French. There is not a man of you who, if he will put himself to it as earnestly for an hour or two each evening as I did to French, will not be even more amply repaid, for he will at least be dealing with a language he knows and speaks daily, the language in which he thinks, and that is a great advantage.

After I left the guidance of my French landlady, I found that I could with a large degree of certainty get good literature, interesting books, if I stuck to authors whose names were internationally known or who were members of the French academy, and when I got hold of a book which had been crowned by the Academy I knew in advance that I had a treat before me.

Unfortunately, there is no English or American equivalent, so far as I know, for the French Academy, and the only guide, other than personal trial, which we have of an author's worth is his reputation, and the only safe guide is what Judge Davis suggested, reputation after a long time, not necessarily fifty years. But of the authors whose sales and reputations made them appear big ten years ago or five, how many appear big today? Not all, by any means. So if you want to be sure to get something creamy, not a mere froth made by much shaking of skim-milk, stick to the survivors of preceding years. If you don't mind a good bit of froth along with a little cream, go in for new stuff entirely, but do it with your eyes open, realizing that you are not only not apt to grow but that it may even be difficult to keep alive on that sort of a diet. Froth soon subsides, but cream becomes the richer and the thicker for standing. If you want cream, go to the milk longest crocked, not to the foaming pail of milk fresh from the cow.

Our post library—is it worth using? It is well worth it; it will repay the user. It will also grow in usefulness as it is used more, and I suspect that it will grow in size as well. We were recently allotted a hundred



dollars for new books and instructed to ask for them. This was done, and, in deference to the taste displayed in the use of such books as we have, new books were asked for, but they were, so far as can be judged from reviews, the best of the new books, not all froth, and I believe that I can recommend most of them. At any rate give them a trial, and if they prove too frothy, go to the chaplain and ask him the names of some good old books, or, if you are afraid that he might tell you of something too improving, go to someone else and get what has interested him. After a few trials you will be able to choose for yourself.

To such of you as do not know it, I announce that the library is on the lower floor of this building, that it is open from 2 to 4 p. m. and from 5.30 to 9.30 p. m., and that you may read there at such times or may then obtain books to take elsewhere to read. There is no charge for the use of books taken out unless they be lost or injured through carelessness or neglect of the borrower.

I advise you all to try the library. It cannot harm you and may help you greatly.



## THE MEDICAL RESERVE CORPS

BY CAPTAIN CHAS. E. VERDIER

*Medical Officers' Reserve Corps, United States Army*

DURING the late war more than 30,000 physicians, with for the most part experience only in civil practice, suddenly found themselves a part of the Medical Corps of the Army of the United States.

Their offer for service was voluntary; to the lasting credit of our profession be it said that we were not drafted for service. The civil physician's conception of medico-military service was about on a par with the action of the newly commissioned medical reserve officer who reported for duty wearing a saber and carrying an umbrella.

A high sense of patriotic duty sincerely actuated the majority of our doctors who volunteered for service, and it is just now beginning to be apparent to many of us who served that the rude shock, which most of us fortunately survived, said shock being provided and kept in constant working order by our brothers of the regular service, was but the evidence of a similar patriotic sincerity of purpose to train us of the reserve to be a part of the regular establishment during the emergency.

Many and lurid are the tales of personal experience, many and keen were the disappointments, blasted hopes, curtailed ambitions and heartbreakings of the volunteer doctors. Adjustments were few, contentment very temporary; then after varying degrees of service came the armistice, wholesale discharge from the service and finally readjustment which, as it particularly relates to the Medical Reserve Corps, is still going on.

Reflection after excitement is all that keeps men sane; personal littleness has no place in a well-ordered mind, and in the calm reflection of these days we can have no adequate words with which to praise that devoted, hard working, constantly harassed and pitifully inadequate, from a numerical standpoint, group of regular medical officers who were our teachers, guides, philosophers, friends and leaders.

As this is penned, our organized Medical Reserve Corps contains about 10 per cent of the number of doctors who volunteered for service during the World War. For the first time in the history of our country we have a definite military policy as laid down in the Act of June, 1920. With customary promptness and with unprecedented efficiency and enthusiasm our "reduced" Regular Army has begun the plans for our Organized Reserve. Handicapped by lack of funds and personnel,

forced to create a proper civilian attitude of interest, progress has been phenomenal.

In our corps those of us who always had the "military bee" are now with the reserve colors; we knew how we stood in 1917-18 and we know how we stand now. Evidences of activity are at hand; medical men, reserve officers, are arranging their affairs in order to attend the summer camps and maneuvers, if lucky enough to be assigned; others are going to divisional schools; still others are applying for promotion, which means preparation, and are taking correspondence courses. Interest is being manifested by men who have never before served in the Army, commissions are being sought by young doctors, and men who refused reserve commissions when separated from the service in 1917, 1918 or 1919 are asking if the commissions may now be had.

With the splendid *esprit* shown by the regular officers detailed for work with the Organized Reserves, much has been accomplished in a very short time; in certain organizations, tables are filled, units are complete, and already keen rivalry of the proper sort and degree has been established.

It is no light thing to have the well-known doctors of a community interested in so important a thing as this Reserve Army of ours. The sphere of influence, particularly with reference to the younger men of a locality, is very strong in the case of medical men.

Natural conservators of the public health by tradition and training, what is more fitting than the development of a proper militant spirit in the medical man?

Actuated by the highest of motives with privilege accorded to few, the doctor who holds a reserve officer's commission is a powerful influence for the good of his community and the upbuilding of his country's ideals. A sound mind in a sound body still holds as good as the day the phrase was coined, and medical men all through the country are getting out the old equipment and wondering if a little preliminary "squads east and west" would not be about the proper thing to get the waistline in shape for the summer camps.

Ours is a very high trust and mission, to carry on, and it is believed that the old animosities are for the most part forgotten and that interest is just as keen as though there were another Kaiser to send to Holland.

One meets his colonel of other days, now a major perhaps and detailed as executive officer of his own medical regiment, and one is glad to recognize the *entente-cordiale*.

Regular and reservist have a task in common; theirs is an identical interest—this country's safety, and they are going about it as brother

in arms. One army, one insignia, only the best men wanted and all of them pulling together.

Such a plan cannot but succeed, and the day is soon to come when an army for the adequate defense of this country will be an actuality, and in this army we of the Medical Reserve Corps hope to have our proper share.



The concluding chapter of Colonel Garrison's article, "Notes on the History of Military Medicine," will be published in the August, 1922, issue.

# AN EPIDEMIOLOGICAL STUDY OF SCARLET FEVER AND ITS CONTROL IN ARMY CAMPS

BY MAJOR E. B. MAYNARD  
*Medical Corps, United States Army*

(With six charts)

*History* (1).—Scarlet fever was, for a long time, confused with both measles and smallpox, and although the special features of the disease were recognized early in the sixteenth century, it was not until the work of Sydenham in 1676 that it was clearly differentiated. Sydenham gave the disease the name by which it is still known, *Febris Scarlatinae*.

The time when scarlet fever first became prevalent in Europe is not known, although it was probably existent long before the period from which we derive its earliest medical description.

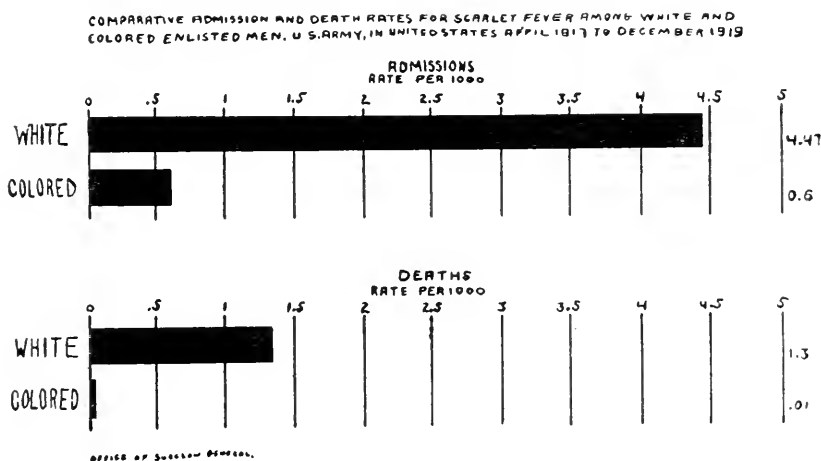


PLATE I

It was studied first in England and Scotland during the years 1661 to 1665, next in Berlin in 1716, in Florence in 1717, and in Denmark in 1740.

In North America scarlet fever first appeared in 1735 at Kingston, Mass., and from there in the next few years it spread over New England. It reached New York and Philadelphia in 1746 and from there spread along the Atlantic Coast to South Carolina, where it apparently died out.

It reappeared in the northern states in 1784 and during 1791 to 1793 penetrated inland to Kentucky and Ohio. An epidemic occurred

in Toronto, Canada, in 1843. It later made its way to the Gulf States and reached California in 1851. It appeared in China and Japan<sup>2</sup> during the period between the years 1873 and 1879.

Its dissemination over South America began in 1830, and it has since frequently appeared in that country in the form of epidemics, often of malignant severity. It made its appearance in Australia and Polynesia between the years 1847 and 1848.

*Age.*—Scarlet fever is a disease of childhood, the greatest number of cases occurring between the first and fifth years (3). Relatively few

CASES OF SCARLET FEVER ABSOLUTE NOS.  
REPORTED TO BOSTON BOARD OF HEALTH  
FROM 1890 TO 1904 BY MONTHS —.

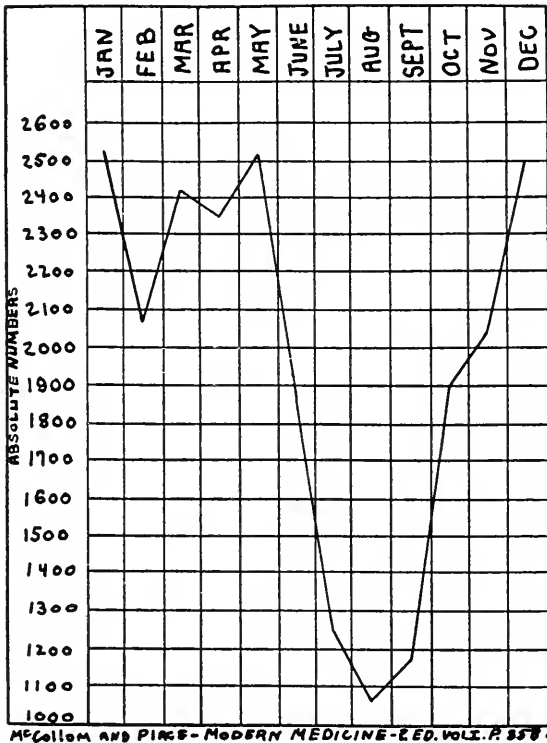


PLATE II

cases occur in those under one year of age; in infants under six months the disease is almost unknown (4). After the fifth year the attack rate drops off, so that it is less between the fifth and tenth years, markedly less between the tenth and fifteenth, and after fifteen the morbidity rate is very low. Adults are relatively immune.

*Sex.*—Sex seems to have no influence, although Donally (5) states that in the first five years of life males seem to be more susceptible than females, while from five to fifteen the opposite holds true.

*Race.*—The Caucasian is the most susceptible race to scarlet fever. In this country the negro is rarely attacked. O'Donnell (6) says that negroes possess a greater degree of immunity and consequently show a lower morbidity and mortality rate than do Caucasians; army statistics

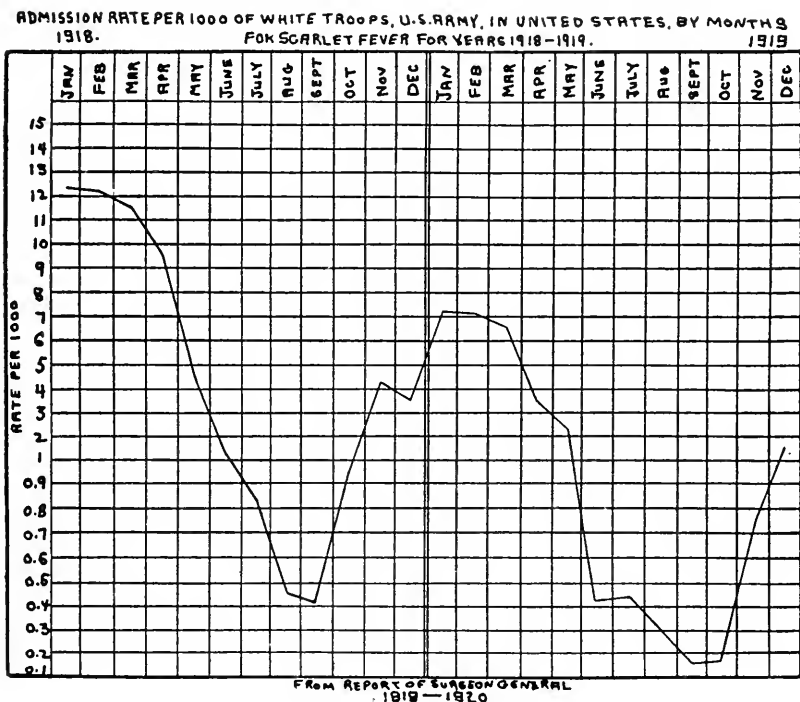


PLATE III

during the World War bear this out, as evidenced by the bar diagram, Plate I, from the Office of the Surgeon General:

The Japanese enjoy high immunity, while scarlet fever is rare among Egyptians, Asiatics, Africans, Chinese, and among the native population of India.

*Season.*—Scarlet fever is a disease of the cold, wet months. As a rule, January and February show the highest seasonal incidence, August and September the lowest. Plates II and III show the seasonal variation in civil and in army life:

The typical morbidity curve rises gradually in the fall and early winter with its highest points in December, January and February, and

then declines gradually, the lowest points being reached in midsummer.

The sudden increase during the winter months is probably due to close association in schoolrooms and through indoor exercise and to increased susceptibility due to the prevalence at this time of catarrhal conditions of the nose and throat.

*Prevalence.*—The general prevalence of scarlet fever seems to have undergone little change during the last century. This is true both in civil life and in the United States Army as indicated in the following table and chart, Plate IV:

#### SCARLET FEVER CASE RATE <sup>1</sup>

*Per 1,000 of Population in Baltimore, 1891–1909*

<i>Year</i>	<i>Rate</i>	<i>Year</i>	<i>Rate</i>
1891.....	3.10	1901.....	0.75
1892.....	6.04	1902.....	1.91
1893.....	0.86	1903.....	2.32
1894.....	2.06	1904.....	2.28
1895.....	1.64	1905.....	1.12
1896.....	1.45	1906.....	1.04
1897.....	1.91	1907.....	0.77
1898.....	1.19	1908.....	2.39
1899.....	0.86	1909.....	0.79
1900.....	0.79		

#### SCARLET FEVER, WHITE ENLISTED MEN U. S. ARMY ADMISSIONS AND DEATHS, 1940 - 1919

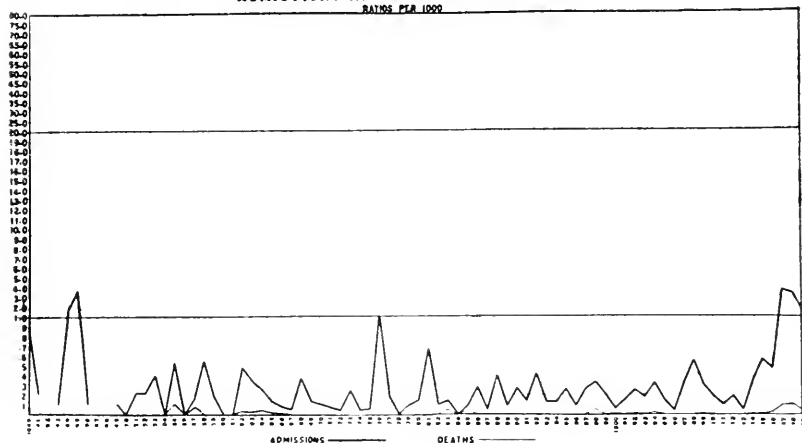


PLATE IV

Osborn (7), Sobel (8) and Donally (5), as a result of careful statistical studies, have expressed the belief that scarlet fever is not diminishing.

<sup>1</sup> Jones: J. A. M. A., 1910, Vol. IX.



*Distribution.*—Scarlet fever is a disease of temperate zones. It is more prevalent in the northern than in the southern part of the United States, as illustrated by Plate V, yet portions of the Eastern Hemisphere with a climate similar to that of the southern states do not show a like exemption (9).

The area of prevalence of the disease is small. The continent of Europe shows the greatest distribution, especially Germany, France, England, the Netherlands and the Scandinavian kingdoms. In these

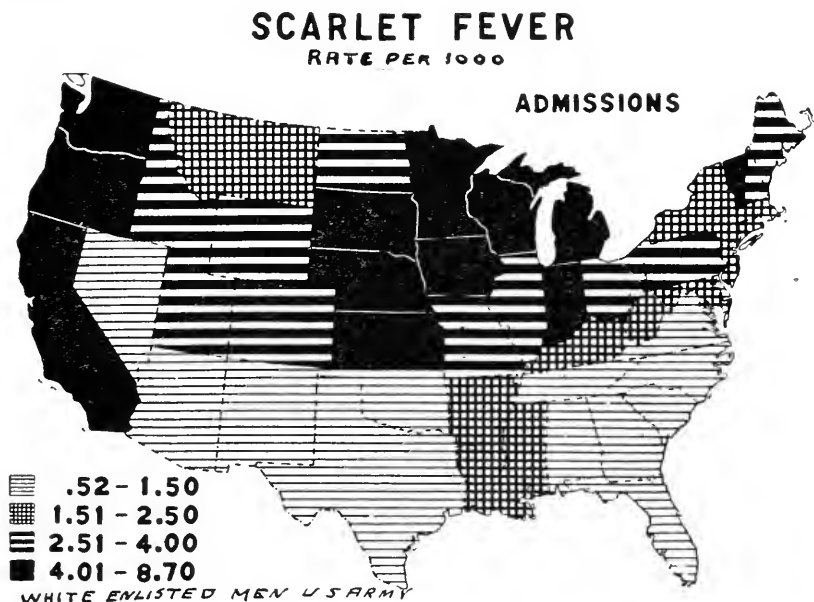


PLATE V

countries scarlet fever is one of the chief factors in the statistics of morbidity and mortality.

The disease is rare in the east, especially in Egypt, and is seldom seen in Africa or Asia except along the coast of Asia Minor.

The rare epidemics which occur in Syria, Arabia, Mesopotamia and Persia are sporadic and of brief duration. The disease is rare in India, and an epidemic can usually be traced to an imported case, the morbidity being confined to Caucasians and Eurasians; when this class of susceptible material is exhausted the epidemic ends. The disease is almost unknown in Japan and only slightly known in China. It is diffused generally over South America, but is not common in Central America (1).

*Periodicity.*—No definite periodicity for scarlet fever has been established. It moves in waves of high and low incidence, probably influenced by the relative immunity and proportion of susceptible persons. Stanley (2) has noted a quinquennial periodicity in the Shanghai epidemics. Hirsch (1) states that the recurrence of epidemiological cycles is not associated with any definite periodicity, and that there is equally little regularity in the return of the disease to any particular locality.

*Virus.*—As compared with measles the virus has low infectivity. In measles 99 per cent of non-immunes of susceptible age contract the disease upon exposure, whereas in scarlet fever only 37 per cent succumb (10). Holt (3) states that not more than 50 per cent of exposed children contract the disease, and Dammasch (11) that it is not so infectious as measles and smallpox, many children escaping after exposure. The incubation period is from twelve to seventy-two hours. The mildest case may prove as infectious as the most severe. Crookshank (12) believes that the virus of scarlet fever of full virulence by passage successively through two or three persons loses, if not its infective potency, at least its power of reproducing typical scarlet fever. In other words, the virus becomes attenuated. At the beginning of an epidemic we see gradual intensification in potency of the virus from that which causes a slight or atypical infection, through a second or third patient finally to one who comes down with a typical attack of scarlet fever. He claims that the normal cycle does not extend beyond six cases of which the earliest and latest are the mildest and least typical. Stanley (2) states that passage of the virus of scarlet fever through the bodies of non-immune Chinese during an epidemic seems to intensify it so that it is more fatal, not only to Chinese but also to Europeans.

*Vehicle.*—Current opinion concerning the relative importance of the three possible agencies for transmission or the vehicles of the virus may be discussed as follows:

1. *Discharges from the Nasal and Buccal Mucous Membranes.*—Osborn (7), Park and Williams (13), Curtis (14), Stanley (2), and Schamberg (4) believe the virus to be spread by discharges from the nose and throat. Purulent discharges from the nose and ear, when these are the seat of suppurative complications during convalescence, may also carry the virus (6). Stickler (15) produced typical scarlet fever in a series of ten children by the subcutaneous injection of mucus scraped from the tongue and fauces of early scarlet fever cases. A disease which closely resembles scarlet fever in man has been experimentally produced in monkeys (16) by injecting scrapings from the tongue of early cases; the disease so caused was transmitted from these to a second series of

monkeys. In this work the streptococcus was eliminated as a possible factor.

2. *The Epidermal Scales during the Period of Desquamation.*—Boudrean (17) states that there is not an authentic case on record produced experimentally by infection with the scales. The patients are usually infective before desquamation occurs. In the series of so-called "return cases" studied by Herriman (18), all desquamation had ceased before the patients were allowed to return to their homes from the hospital, so that in this series the scales could not have been a factor. Kerley (19) does not believe there is danger from the scales *per se*, and Baguisky (20) reports a series of forty-five cases discharged from the hospital as cured after the cessation of all desquamation, which were responsible for "return cases." According to Schamberg (4) there is no evidence to prove that the scales do convey the infection, but much of a negative character to indicate that they do not. Welch (21) does not believe the scales convey the infection, and Stanley (2) considers the scales unimportant. O'Donnell (6) states that it is not now the belief of public health authorities who have studied this disease that the desquamated skin carried the virus. It must, of course, be recognized that the scales may act mechanically as carriers of nasal or throat discharges by which they have become soiled.

3. *Fomites.*—Chapin (22) states that of 13,970 cases occurring in Michigan only 335 were attributed to fomites, and that when blame is attached to fomites, it is usually by the process of elimination when no other factor has been found. He thinks that missed and atypical cases would explain many of the "fomite" cases. Curtis (14) says that contact with a case and not with fomites causes the disease. Nesbit (23), after careful study, was unable to prove that books from public libraries could convey the disease, and Stanley (2) thinks that fomites are infectious to but a limited degree.

To summarize:

1. Discharges from the nose and throat are the important vehicle for the virus of scarlet fever.
2. In suppurative complications of the middle ear or sinuses, the pus may contain the virus.
3. The desquamated epithelium is incapable of spreading the infection, unless the scales are soiled by nasal or throat discharges.
4. The most infectious stage is early in the disease before the beginning of desquamation.
5. "Return cases" have resulted from contact with convalescents after all desquamation had ceased.

6. Fomites can be clearly implicated in the spread of the infection in few instances.

*Carriers.*—From the above it is clear that the spread or transmission of scarlet fever depends largely on the infected individual. This leads to a discussion of mild or unrecognized cases and healthy carriers of the infection. It is reasonable to assume that many of the persons, especially adults, with severe sore throat seen during scarlet fever epidemics, really have atypical scarlet fever, and that such cases constitute an important factor in the spread of the disease.

Thus we may account for many cases which cannot be traced to a known focus of infection. Hand (9) thinks that the disease is spread by missed and mild cases and that it is probable that scarlet fever exists as a severe sore throat without a rash. Schamberg (4) has suggested that individuals may carry the virus of scarlet fever without harm to themselves until a severe burn or surgical operation lowers their resistance sufficiently to permit the disease to develop. He has noticed that severe operations on the nose and throat seem especially to give rise to cases of so-called surgical scarlet fever. Boudreau (17) says that the disease is endemic in all of the large centers of population and is kept alive between epidemics by missed, wrongly diagnosed and abortive cases. Murchinson (24) thinks that adults exposed to scarlet fever are liable to suffer from sore throats without fever or eruption. He believes that such adults can convey the typical disease to children.

*Milk* is sometimes the agent through which the virus of scarlet fever is spread. An epidemic of scarlet fever due to milk is explosive in character, beginning and ending suddenly. It is a disease of the well-to-do rather than of the poorer classes of the population. Cases are scattered over a definite area and frequently there is no contact history between them.

Upon checking up the various distributors, it is found that the cases are on the route of some particular milk dealer. In a large number of instances the epidemic can be traced to an employee at the offending dairy. Ewart (25) states that the percentage of milk drinkers attacked in ordinary epidemics is twenty-seven, whereas in milk-borne epidemics 78 per cent of the attacked are milk drinkers. The part played by the milk in the transmission of scarlet fever appears to be entirely passive. It seems, however, that the virus must either be highly infective, which under ordinary circumstances does not seem to be the case, or that the virus must increase after reaching the milk; cases have occurred in which the milk from the infected source, when finally delivered, has been highly diluted with milk from other farms.

Park and Williams (13) state that the danger from milk epidemics is

a real one and that the aggregate of cases from such outbreaks is not inconsiderable.

Chapin (22) states that in thirty-five out of fifty-seven such epidemics studied, an infected person, usually a mild case, was found to have handled the milk, and in three other instances it was traced to milk bottles from an infected house.

There seems to be no evidence that cows can have any disease resembling scarlet fever in the human, or that they can transmit such a disease to man through milk, unless it be due to outside infection.

Hunting (26) says that streptococcus infections of the teats of cows and cow pox are not infrequent in dairy herds, and these conditions seen during an epidemic of scarlet fever might erroneously be thought responsible in the absence of recognized human foci. He thinks that an exhaustive investigation of these epidemics will reveal the human source of infection.

*Immunity.*—Many individuals seem to possess natural immunity to scarlet fever, as repeated exposure fails to cause infection in them. Some races possess immunity, partial at least, as is seen in the Japanese, Egyptians, Arabs, Indians, and American Negroes. Adult life brings with it a relative immunity in susceptible races, and there is often seen a low susceptibility to the infection in certain families. Hand (9) suggests that this may be due to active immunity brought about by repeated exposure to small doses of the virus. In some cases immunity may be lost (4) following severe burns, surgical operations, particularly of the nose and throat, and after a long absence from the source of infection.

*Mortality.*—From a statistical study of 2,000,000 cases of scarlet fever Donally (5) concluded that one person in each thousand contracts scarlet fever and that of these one in twenty dies. In this series he found the death rate to be relatively and absolutely greater among males and the mortality highest among cases occurring during the summer months—lowest in the fall.

The mortality rate averages 4 per cent (27). Schereschewsky (10) states that the mortality has been found to vary from 1 to 15 per cent in different epidemics. As a rule the death rate diminishes as the age increases. The following chart, Plate VI, shows the mortality percentage by age groups.

#### THE CONTROL OF SCARLET FEVER IN ARMY CAMPS

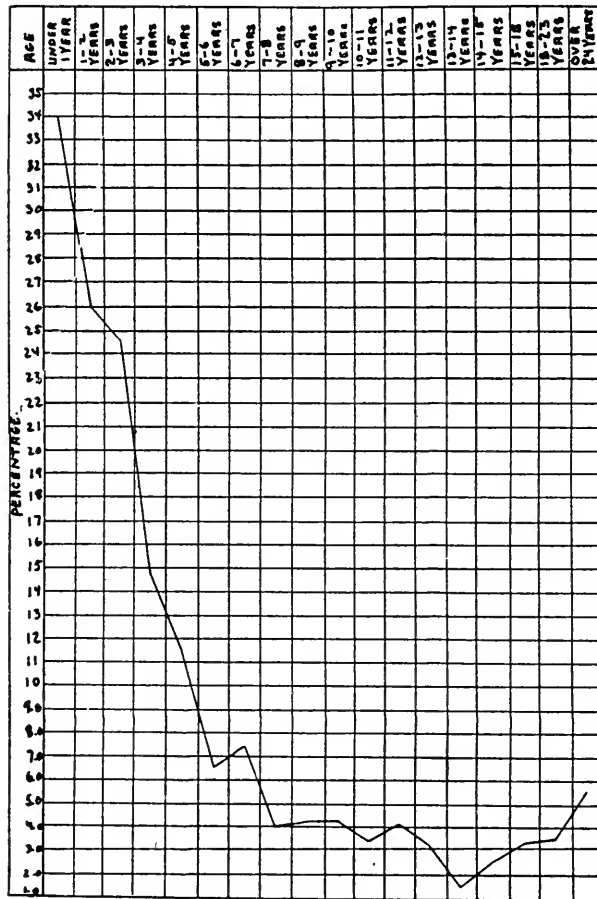
This phase of the subject may be discussed under three headings:

A.—Measures which, if applied successfully, would prevent the introduction of scarlet fever from without. These procedures are

directed against infectious disease in general and aim to afford time for the detection and proper disposition of carriers and unrecognized cases before recruits have had the opportunity of mixing with other troops.

1. A portion of the camp should be set aside as a detention camp

PERCENTAGE OF FATALITIES BY AGE GROUPS IN GOOD HOSPITAL CASES OF SCARLET FEVER



McGILL AND PLACE, MODERN MEDICINE, VOL. I. P. 888.

PLATE VI

where incoming recruits would be required to remain for at least three weeks.

2. This camp should be isolated from the rest of the command and all intercourse between recruits and camp restricted to a minimum.

3. A working quarantine should be established; this may be defined

as the segregation of an exposed group without restriction of regular duties or drills.

4. Under ordinary circumstances daily inspection should be made by a medical officer, and twice daily during an epidemic.

5. During non-epidemic periods recruits arriving singly or in small numbers may be assigned directly to organizations, reporting daily to a medical officer for inspection for a period of three weeks.

*B.*—Measures to be taken upon the identification of a case of scarlet fever.

1. Such part of the command as the camp surgeon may designate should be inspected immediately and, until danger of an epidemic has passed, twice daily by a medical officer.

2. All frank and suspicious cases of scarlet fever should be immediately hospitalized.

3. Suspicious cases may be defined as individuals having irritated throats and a temperature of 100° F. or above. A grouping should be made of all susceptible and non-susceptible persons.

4. Attention should then be concentrated on the susceptible group and all healthy close contacts placed in a working quarantine; daily or twice daily inspection should be made of these men.

*C.*—Dispensary and hospital management.

1. An allowance of 1,000 cubic feet of air space per man is necessary.

2. Beds should be cubicled by hanging sheets strung on wires between them.

3. Medical officers, nurses and ward attendants should wear masks, caps and gowns while on duty in the ward.

4. As far as possible, the nurses and ward attendants should be selected from among those who have had scarlet fever.

5. Sputum and nasal discharges of patients should be burned or disinfected.

6. The ward floors should be mopped daily with a cloth wet in a disinfectant solution.

7. All dishes and eating utensils should be boiled after each use.

8. The use of individual drinking cups should be insisted upon.

9. Patients should not be discharged from the hospital until all nasal, aural, glandular and other abnormal discharges have ceased, and all open sores healed.

10. In no case should a patient be discharged earlier than six weeks from the onset of the disease.

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# A REVIEW OF EIGHTEEN CASES OF PULMONARY ABSCESS<sup>1</sup>

By WILLIAM O. H. PROSSER, A.B., M.D.

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A SEARCH of the files of the Medical Division of the University of Pennsylvania Hospital, for the past twelve years, resulted in the finding of 18 cases of pulmonary abscess. While this disease has appeared extensively in the recent literature, 5 of the 18 had such direct bearing on diseases and operations involving the upper respiratory tract that the writer was prompted to relate them before this meeting. Two of the five occurred in cases suffering from convulsions, two followed extraction of teeth, and one was a sequel to tonsillectomy.

"The most common factor in a series of lung abscess at the Massachusetts General Hospital," according to Whittemore,<sup>2</sup> "was the precedence of an operation on the upper respiratory tract under a general anesthetic. Out of 32 cases in which the etiology was definite, 17 were due to the removal of tonsils, 1 to the removal of adenoids only, and 3 to the extraction of teeth, this giving a total of 21 cases, or 65 per cent due to this cause." Lord<sup>3</sup> says: "In 25 out of 100 cases, or 1 out of every 4, the cause may be definitely traced to operation about the upper respiratory tract. Pulmonary abscess followed operation about the mouth for cancer of the jaw, of the lip, and of the tongue in 1 case each, the removal of tonsils or tonsils and adenoids in 12 cases, the incision of a peritonsillar abscess in 1, and the removal of teeth in 9."

The next most common cause of pulmonary abscess is respiratory infection of one type or another. In 89 cases of lung abscess from autopsy findings at the Bellevue Hospital,<sup>4</sup> New York, 29 followed bronchopneumonia, 18 lobar pneumonia, pyemia 15, septicemia 11, thrombosis of various veins 8, septic endometritis 7, infective endocarditis 6, and—this will be of especial interest to the present gathering—acute suppurative otitis media 5.

Norris and Landis<sup>5</sup> report 31 cases of pulmonary abscess compiled from autopsy records of the Pennsylvania Hospital in which bronchopneumonia was the etiological factor in 6 cases and croupous pneu-

<sup>1</sup> Read, by invitation, before the Section of Otology and Laryngology of the College of Physicians of Philadelphia, January 18, 1922.

<sup>2</sup> Whittemore, W.: "Lung Abscess." *Surgical Clinics of North America*, p. 765, June, 1921.

<sup>3</sup> Lord, F. T., quoted by Whittemore, *Loc. cit.*

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<sup>5</sup> Norris, G. W., and Landis, H. R. M.: "The Diagnosis of Pulmonary Abscess." *Tr. A. Am. Phys.*, xxviii, 302, 1913.

monia in 3, while vegetative endocarditis caused 6; mastoid disease, thrombosis of the portal vein, thrombosis of the lateral sinus, otitis media and appendicitis 2 each; and abscess of the kidney, of the lip, of the pharynx, of the seminal vesicles, and of the skin, 1 each.

The 18 cases reported herewith can be classified as to their etiology as follows: Pneumonia 5 cases, extraction of teeth 2, convulsions 2, tonsillectomy 1, tonsillectomy and adenoidectomy with post operative pneumonia 1, suppurative appendicitis 1, inguinal herniorrhaphy 1, and undetermined 5. There are therefore 13 of the 18 which have a definite etiology; 6 followed operations and, of these, 4 were in the mouth and throat.

Of the two cases that followed extraction of teeth one already has been reported by Dr. O. H. Perry Pepper.<sup>6</sup> The history of the other is so typical as to be classic and is as follows: The patient was a white man of 50 who on November 19, 1921, had 22 teeth extracted under gas anesthesia. He states that the majority of these were loose and the associated pyorrhea was very severe. Two days after the extraction the patient felt so ill that he could not go to work. On the fifth day he noted the presence of pain in the posterior portion of the right axilla radiating down the right side and to the right shoulder. On the eighth day a very offensive odor to the breath was noticed, and on the following day, the ninth after the operation, he had a coughing spell and spat up a quantity of brown purulent material. Four weeks after the onset of these symptoms he was admitted to the hospital suffering from cough, foul expectoration, and loss of weight. Aside from the lungs the physical examination was negative with the exception of a mild grade of secondary anemia, and a leukocytosis of 13,000, of which 81 per cent were polymorphonuclear leukocytes. Over the right chest posteriorly from the 4th dorsal spine to the base there were distinct signs of consolidation. The sputum was purulent, slightly blood tinged, and very offensive. It contained pneumococci, staphylococci, many erythrocytes and pus cells but no tubercle bacilli. The X-ray diagnosis was "abscess or gangrene of the upper part of the right lobe." On the second day after admission operation was decided upon, and a two-stage thoracotomy was performed. The abscess was found to lie deep in the tissues of the right upper lobe. Drainage tubes were inserted into the affected area, and at this writing the patient is discharging pus in decreasing daily amounts. He also shows marked general improvement.

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<sup>6</sup> Pepper, O. H. Perry: "Post-Operative Pulmonary Complications with Three Illustrative Cases." *Med. Clin. of North America*, p. 737, November, 1921.

The next two cases are of particular interest because of the unusual manner in which the infection was probably introduced into the lung parenchyma. Both of them suffered from convulsions and epileptiform seizures for many years prior to the development of their lung abscesses. The first of these is a white man of 46 with a history of perfect health, except for his convulsions, until the spring of 1918, when he noticed soreness around the border of his right chest. About two or three weeks later he began to have coughing spells and expectorated thick yellow material of foul odor. He was put to bed for eight weeks and the trouble seemed to clear up, but three months later there was a return of the cough and of the foul, bloody sputum. This patient had had convulsions for the past twenty-eight years, coming on mainly at night and attended by frothing at the mouth, but apparently he did not bite his tongue. These convulsions occurred on the average of twice per month, but shortly before admission he had been having three or four per day.

On physical examination the chest was found to be normal everywhere excepting in the upper right axilla. Marked dulness was noted here with diminished breath sounds and many râles. The sputum was foul and contained pus and blood but no tubercle bacilli. The blood count showed mild secondary anemia with 10,000 leukocytes and 58 per cent polymorphonuclear leukocytes. The X-ray examination revealed a "localized collection in the right side high in the axilla, with probable rupture into a bronchus." Two exploratory punctures made over the affected area in the right upper axilla were negative for pus. Additional X-ray studies confirmed the first findings as abscess in the lung. The patient improved rapidly during the two months following and was discharged with physical signs practically cleared up.

This case did not go to operation, so the diagnosis of lung abscess cannot positively be made, but his history prior to admission and the physical signs, together with the X-ray and sputum findings, justify this diagnosis. The question is: Did he aspirate into his lungs some infective material or foreign body while in a convulsive seizure? This is a very possible occurrence.

Literature records cases that have developed aspiration pneumonia and pulmonary abscess, with convulsions as the etiological factor. Carr<sup>7</sup> states that "aspiration pneumonia, especially of the insane, is often the cause of lung abscess." Davis<sup>8</sup> cites an eclampsia case that died following an extraperitoneal Cesarean section. He states

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<sup>7</sup> Carr, James G.: "A Pulmonary Abscess Following Tonsillectomy." *Med. Clin. of North America*, p. 209, July, 1919.

<sup>8</sup> Davis, Edward P: "Obstetrics." *Progr. Med.*, p. 84, September, 1921.

that "the mother had 15 convulsions after operation, a high fever, and developed pneumonia. Autopsy showed gangrene and abscess of the lung and empyema." The same author refers to another case as follows: "One eclampsia patient died of pneumonia through aspiration during her convulsions, as proved by autopsy."

The second convulsion case with pulmonary abscess is as follows: A white man of 41 was admitted June, 1921, to the wards of the University Hospital complaining of cough and profuse expectoration. The patient stated that in the fall of 1918 he began to have attacks of dizziness and would momentarily lose touch with his surroundings. These attacks were preceded by regurgitation of sour fluid into his mouth. On one occasion he fell to the floor and was unconscious for fifteen or twenty minutes and his legs and arms were seen to twitch. He had two or three major attacks a week, most of them at night. He never bit his tongue nor lost sphincter control. About two months before admission he fell a distance of approximately 7 feet, alighting in a standing posture. He was severely shaken up but apparently uninjured, as he was able to continue his work for the remainder of the day. That evening, while attempting to arise from a chair, he was seized with a sudden sharp pain in his lower right chest. Coughing began immediately, and he expectorated thick brown sputum of very foul odor. Attacks of coughing with expectoration continued thereafter until his admission to the hospital. On some mornings he would cough up half a cupful of purulent material. The patient declared this to be the first illness he had ever experienced.

On physical examination percussion was impaired in the lower posterior axillary region of the right chest, the breath sounds were distant, and there were râles in the right axilla and lower right base. The sputum consisted of yellow mucus, containing staphylococcus albus, mic. catarrhalis, and a nonhemolytic streptococcus. The X-ray report was, "Lesion, right lung, about the middle, exact nature uncertain, appearance suggests some cavitation." Further study of this case was cut short by the patient insisting on his discharge from the hospital. However, it is interesting to note that the ward chief, Dr. Richard Kern, expressed his opinion to the physician who referred the case as follows: "This patient is suffering from two diseases; the one, epilepsy, with mostly minor attacks but with some of a major type. These may explain his falls. They may also explain his chest condition, for during an attack he may have inhaled a foreign body. The signs of the lung condition are those of a lung abscess communicating with a bronchus. The X-ray confirms this diagnosis."

The last case is one of pulmonary abscess following tonsillectomy.

A white woman of 30 with a previous history of perfect health was admitted to the ward suffering from cough, expectoration, and pain in the chest. The patient had had a tonsillectomy done, and she recovered from the operation perfectly. Ten days after the operation she noticed pain in the lower part of her left chest, accompanied by fever, chills, and a few days later cough and expectoration. She went to bed for three days and then was sent to another hospital, where she remained for two months. Following that, she spent five months in the mountains but without any marked improvement. Her condition compelled her to return to the city, and she was admitted to the University Hospital suffering from cough and profuse bloody expectoration. Her chest was impaired to percussion on the left side low down in the mid-axillary line. Moist râles were heard. The X-ray diagnosis was, "Lung abscess, lower lobe, left side." The patient received postural treatment for one month and an autogenous vaccine made from her sputum. Her improvement was not marked, so it was decided to drain the abscess. Unfortunately she did not survive the operation.

The autopsy showed an abscess in the upper lobe on the left side, of the size of a walnut and situated on the lateral surface of the lung. There was also found an abscess cavity the size of a hazelnut at the base of the left lung. There was no communication between the two abscesses. The walls of the cavities were firm and fibrous and the surrounding tissue was congested and edematous. The abscess in the lower lobe communicated with a fair sized bronchus.

Pulmonary abscess touches nearly every phase of medical activity and is of practical interest to the internist, the phthisiologist, the general surgeon, the laryngologist, the dentist. No operator can have foreknowledge as to when such an accident is to occur, and therefore a familiarity with the various etiological possibilities is of value. That lung abscess can follow a convulsive seizure seems not to be widely known, and it is possible that cases which have been ascribed to other causes could, on a searching of the patient's history, plausibly be ascribed to this cause. That this condition so frequently follows multiple tooth extraction likewise seems to have escaped general notice. These two points, combined with the writer's interest in the subject, are what mainly prompted the preparation and presentation of this communication.

The writer wishes to express his thanks to Dr. Alfred Stengel, Professor of Medicine in the University of Pennsylvania, to whom he is indebted for permission to use the medical records of the cases herein discussed.

## PLASTIC REPAIR NASAL DISPLACEMENT AND DEFORMITY

BY MAJOR RALPH H. GOLDTHWAITE

*Medical Corps, United States Army*

LATERAL displacement of the nose with deformity from fracture, while comparatively easy to repair at the time of the injury, becomes very difficult when years have intervened and thorough consolidation of the tissue has taken place.

In recent fractures, after a thorough cocainization of the nose, a dull-edged periosteal elevator of size and strength suitable to the nose injured is introduced into the nose and slid high up against the lateral wall on the depressed side. A firm lifting movement guarded by the other hand placed externally on the nasal bone will lift it up into its normal position. In single fractures this will often take place with a snap, but in comminuted fractures the replacement must be done with a gradual moulding of the tissue by the external hand against the outward and upward pressure of the periosteal elevator inside. When the bones are properly set they should remain in place when the elevator and hand are removed. If they settle back or displace when left to themselves, the set is not correct. Nasal packing with gauze will only maintain a position in which the tissues are at rest. If there is any tension or tendency to spontaneous displacement, the packing will not prevent the recurrence of the deformity.

If the case only reports for treatment after healing has taken place, the problem of removal of the deformity becomes difficult, and the cases herein presented give a method of approach for relief of these cases.

The essential elements in obtaining proper repair of old neglected cases are, first, a complete submucous resection so that, in the readjustment of the parts, bilateral nasal breathing can be established and the resistance of the tissues to operative fracture and resetting is greatly diminished. Secondly, the nasal bones must be so freely mobilized that they will be placed in the desired position and so they will not be displaced by any natural pull of the adjacent tissues. Thirdly, the lateral cartilages must be entirely separated from the nasal bones so as to permit a new relation to be established between bone and cartilage during the healing process.

A. R. C., Headquarters Co., 1st Battalion, 29th Infantry, was seen by me in October, 1921. The whole nose had been crushed laterally in a boxing contest five years previously and no repair had been

attempted. Nasal breathing had been stopped on both sides ever since the injury. The nasal bones were deformed and laterally displaced, so that even with the tension of the flesh of the face drawing the flexible tip back towards the median line, the tip measured 1 inch displacement to the right. The septum was crumpled so that no complete examination of either nasal space was possible. On November 9, under local anesthesia, a complete submucous resection of the nasal septum was performed, then the lateral cartilages were cut loose from the nasal bones on both sides, and through the opening thus produced the nasal bones were chiseled loose from the superior maxilla. Heavy Ash forceps, tips guarded with rubber, were used to refracture the nasal bones at the bridge of the nose, and the bones reset in approximately the proper position. Rubber tissue drains were inserted into the lateral incision openings and the nose packed on both sides with vaseline gauze. The packing was removed the following morning and the wicking removed one day later.

Healing took place without complications. Nasal breathing was started by the third day and he returned to duty November 22.



# MENTAL INSTABILITY IN EX-SERVICE MEN—HOW ACQUIRED; HOW REMEDIED<sup>1</sup>

By SAMUEL WOLFE, M.D.

*Salt Lake City, Utah*

TO COVER what I intend, my subject may not be considered as altogether well chosen. Stability can hardly be considered as a mental process. It is rather a result obtained by harmonious and balanced action of all mental processes and must be considered as applying only to a considerable extension of time. A single good and worthy act, no matter how high it may rank, intellectually or morally, will constitute no evidence of it. It must be thought of in connection with such terms as patience, persistence, consistence, as well as with worth and reason. It is not a matter of intellect alone but of the composite interaction of mental faculties. It cannot be measured by the Binet-Simon test.

It can be applied to any type and grade of mind, either positively or negatively. It is only when, by its degree of absence, it results in maladjustment and becomes distinctly anti-social that we begin to have that practical instability which characterizes the whole group of neuroses and psycho-neuroses.

That it does not take measure of intelligence is well illustrated by the fact that morons, as a class, are immensely useful in industrial life at the lower unskilled levels, and that in military life they have also quite largely proved to be good soldiers in the lower ranks.

That what might be called virulent heredity does not figure largely in the etiology which lies on the side of constitutional inferiority, or native predisposition, in the ex-service men is self-evident. Those who have been too much tainted, the idiots, imbeciles and feeble-minded, are a class of individuals that do not generally live to military age and, of course, would at once be excluded when they arrive at such an age. It is rather that legacy, which parents contribute, which is the result of defective training through childhood. The parents who pet their children so carefully that they shield them from coming in contact with the world and in fairly free association with their fellows of equal age are often unconsciously laying the firmest foundation for the neuroses in later life. At the time of arrival of these at military age, the defects are often in existence; but this class often has a great taste for adventure, as well as a degree of bravado, which leads them to deny or at least not to reveal their true condition, and thus the draft boards and

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<sup>1</sup>Read before the Clinical Conference, U. S. Public Health Service, 11th District, Denver, Colo., May 28, 1921.



military medical authorities could be easily gotten by. The discovery of disease or defect in these milder cases depends so largely on anecdotal evidence, which is quite often discredited, that here there is another reason for many getting into the service, where the outcome shows that it would have been wise to exclude them. Many of these, moreover, were more benefited by their access to the ranks than they would have been by anything else which would have been likely to happen to them. Whether more neurotics have been made or cured by service will probably remain an open question. The determining factor possibly largely lies in the character of the experience they met with. Whether in camp or in action, there was much that could act powerfully in either direction. That which we are concerned with is that which was of a causative character. In this category we can put the association with their fellows, the feelings toward their commanders, the discretion with which the more fatiguing and exacting in drill and labor were carried out, the news from home, and the horrors of actual fighting.

I have no doubt that in the course of the service, and probably immediately after their discharge, numerous cases of pure neurasthenia or mere downright nervous exhaustion were encountered. But these have long since been disposed of—have probably all ended in full recovery. As for those which now remain to us, they universally have the neuropathic taint, and with this began their service.

But there remains still a very important etiological factor to consider; taken altogether, possibly the largest. The period of readjustment to civil life after discharge presented hard problems to all, unless we except those who had a very brief term of service.

Those who came back to find their homes or places of affectionate refuge ruined by the unfaithfulness of a wife or sweetheart, by the death of loved ones or financial ruin, truly had cause for grief, sorrow and discouragement. Then, too, the interrupted first budding careers or well-established businesses must be rebuilt or new ones constructed. Their former places of employment filled by others, none open to them, no visible means of support, life to begin over again. Of course, for a brief time, they were great heroes. They were pampered. Greeting, praise and acclamation followed them everywhere. But this is not staple life. The reaction must come. The realities must be reckoned with.

For months or years they had been independent of any of the ordinary cares of civil life for support and subsistence. Habits, well enough suited to the camp and field but in no wise adaptable to home or business, had gained stronghold. In efforts to adapt and adjust, by no means all succeeded.

Then came the work which we are now engaged in—to determine disability, incurred or aggravated, to rehabilitate, and to compensate. Without detracting one iota from the glory and wonder with which this has been conceived and already largely achieved, there is, in connection with the class which we are considering, the same mischievous element, which for so long has figured in the industries, in having their liabilities in a similar class adjusted. Whether in or out of court, compensation claims of this nature have a difficulty all their own. It constitutes a special problem, and I am hopeful that, with further study, a way better than any we have yet found may be consummated.

And now, what can we do for these poor unfortunates? No ordinary drug therapy nor surgery will reach them. With all its promise, glandular therapy has not yet arrived at a point where it can be generally specifically applied. Ordinary hospitalization offers nothing for them worth while, on account of their protracted nature. The great majority will not make good in vocational training. Special institutions, except for those that are adjudged insane, are not yet in existence to an extent to admit of their care, except in a few of the graver cases. When these institutions come, as they are now provided for, there will be still great inefficiency in their accomplishment unless the school idea is incorporated with that of the sanatorium. These patients, in the mental sense, are children. They either have never emerged entirely from their infantile state or they have reverted back to it, and in the matter of adaptation the course of development must be continuous. Of course these schools must be managed by those specially adapted. The psychoanalyst may or may not here come to his own. With it all, continuous compensation must probably be abandoned. The central idea must be rehabilitation. It is no mean task, but, approached with the proper attitude and with sufficient perseverance and skill, to the writer it seems that it should be attainable.



# SCHEDULE OF RATINGS FOR EYE, EAR, NOSE AND THROAT DISABILITIES IN AMERICA, GREAT BRITAIN, FRANCE, ITALY, BELGIUM, AND GERMANY<sup>1</sup>

BY MAJOR HARRY VANDERBILT WÜRDEMANN

*Medical Officers' Reserve Corps, United States Army*

IN THE course of an investigation occupying the last two years, the author brought together a large amount of material dealing with the rules for the estimation of indemnity for disabilities of vision, hearing and speech and their organs, which was instigated by the general demand for more or less adaptable rules for the calculation of indemnity for injuries to these organs and their functions. While the material is as yet far from complete, sufficient was gathered to present a report to the Pacific Coast Oto-Ophthalmological Society in 1921.

## INDUSTRIAL INSURANCE AND INDEMNITY RULES

Such material as pertains to general governmental conditions, and especially as regards indemnities for soldiers and sailors injured during service, has been abstracted from this report and is herewith submitted, as it is believed that the army and navy surgeon should be cognizant of the progress made in this line. Permission has been obtained from the several governments to print these reports in medical journals.

TREASURY DEPARTMENT, WASHINGTON

BUREAU OF WAR RISK INSURANCE

*August 16, 1921.*

DR. HARRY VANDERBILT WURDEMANN,  
*American Journal of Ophthalmology,*  
*Cobb Building, Seattle, Washington.*

DEAR DR. WURDEMANN:

I have your letter of August 4 in which you request permission to publish the schedule of ratings for Eye, Ear, Nose and Throat disabilities. I see no objection to the ratings for these disabilities being published in a professional medical journal,———and your request is hereby granted.

Very truly yours,

C. R. FORBES,  
*Director, Veterans' Bureau.*

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<sup>1</sup>Reprinted from Transactions of the Pacific Coast Oto-Ophthalmological Society, 1921.

TREASURY DEPARTMENT, WASHINGTON  
BUREAU OF WAR RISK INSURANCE

March 10, 1921.

DR. HARRY V. WURDEMAN, *Dr. Harry V. Wurdemann,*  
*American Journal of Ophthalmology,*  
*Cobb Building, Seattle, Washington.*

MY DEAR DR. WURDEMAN:

Your letter of February 12 in which you request the table of disability ratings for Eye, Ear, Nose and Throat diseases has just been brought to my attention.

I am sending herewith a copy of these ratings with the clear understanding that it will not be published or given out for publication or quoted in medical or lay press.

Permission is given to use the text for discussion in professional medical meetings as a confidential government document. All treatment is carried on by the Public Health Service and the rates of compensation for specialists' professional services may be obtained from the Surgeon General. The fee provided by this bureau for diagnostic specialists' medical examinations of claimants for Eye, Ear, Nose, and Throat disabilities is \$5.00.

Until a reclassification of our records by disease is completed, in place of present filing by claim number, no accurate statistical statement of the incidence and variety of disabilities on this group can be offered.

Very truly yours,

R. G. CHOLMELEY-JONES,  
*Director.*

TREASURY DEPARTMENT, WASHINGTON  
BUREAU OF WAR RISK INSURANCE  
OFFICE OF DIRECTOR

May 12, 1920.

MY DEAR DOCTOR RUCKER:

Following out the policy which was agreed upon at our conference, will you be good enough to request Dr. Harry V. Wurdemann, Seattle, Wash., to review for the bureau that portion of the table of disability ratings relating to the *Eye*?

While we have had the advantage of the experiences of other governments, as well as the knowledge which has been gained in the application of the table prepared by the bureau, I nevertheless feel that we should avail ourselves of the services of certain leading American specialists in order that our table shall represent the most advanced medical thought.

I realize that in so doing we will be placing a considerable burden upon these distinguished gentlemen, but I feel confident that, because of the importance of the undertaking and its effect upon future welfare of so many of our ex-service men and women who have suffered injury or disease in the defense of the nation, I am justified in the belief that Dr. Wurdemann will not hesitate to add to the distinguished contri-

bution which he has already rendered the country at large, as well as to his own community.

Very sincerely yours,

R. G. CHOLMELEY-JONES,  
*Director.*

Assistant Surg. Gen. W. C. Rucker, U.S.P.H.S.,  
*Chief Medical Adviser,*  
*Bureau of War Risk Insurance,*  
*Washington, D. C.*

U. S. OF AMERICA SCHEDULE OF RATINGS FOR EYE, EAR, NOSE  
AND THROAT DISABILITIES

FOREWORD

In arriving at the following schedule of ratings for the Eye, Ear, Nose and Throat disabilities the various opinions of leading Eye, Ear, Nose and Throat Specialists in the United States and the schedule of ratings of Belgium, France, Canada and England now in effect have been taken into consideration.

1.

To guide the Medical Officer in rating Eye, Ear, Nose and Throat cases (particularly for refractive errors) the opinion must conform to the opinion of the General Counsel issued in eye cases causing less than 10 per cent disability.

(a) No treatment or corrective appliances (glasses) can be provided unless the disability is 10 per cent and is shown to be connected with service.

(b) If the disability is due to those defects of form, shape, and structure of the eye which are known to be of congenital origin, <sup>such</sup> as astigmatism (except traumatic) and hypermetropia and myopia, even if not noted as existing prior to service, it will not be considered as of service origin and will not justify treatment or compensation, even if thought to cause disability of 10 per cent or more.

(c) The supplying of glasses for correction of refractive errors during service, unless there is specific evidence showing that the character of duties performed during service was such as to have certainly caused or aggravated such errors of refraction, shall not be construed as evidence of service origin of refractive errors known to be due to congenital errors of structure, form, or shape of the eye.

(d) Provisions of glasses shall not be authorized in any case by temporary partial rating of 10 per cent or more for a limited period, or by other use of rating unless the conditions under (a) are shown to prevail.

(e) When a rating of 10 per cent or more is given for a disease or disability other than a defect of refraction, in the treatment, relief, or care of which the correction of the refractive error is considered to contribute an important or essential element, the rating will be concurred in by the Eye, Ear, Nose and Throat Section even if the refractive error is rated at less than 10 per cent, and the claimant will be ruled eligible to receive such correction of refraction as will materially contribute to the cure, arrest, or maximum improvement of the condition for which the rating of 10 per cent or more is made.

For the correct application of the War Risk Insurance Act, in cases in which the claim for treatment or compensation is based on the presence of refractive errors or upon tonsillectomy, turbinectomy, etc., the following is for the information to the Medical Referees of this bureau as a guide in the making of ratings.

There will doubtless appear for some time, but in a continually diminishing number, patients for whom authority has been given on a temporary partial rating of 10 per cent for a limited period for the purpose of permitting them to obtain glasses, for the removal of tonsils, septum and turbinates, at the expense of the bureau. This, we are advised by the General Counsel, is not permissible under the Act, and will be discontinued.

Without authority based on service connection and 10 per cent or more disability for refractive error, tonsils, etc., you may not authorize the supply of glasses or the removal of tonsils, etc., except under such conditions of emergency as may arise in each case. Loss of glasses, need of change of glasses, tonsillectomy several months after discharge, etc., are not considered an emergency within the meaning of the law. When patients are hospitalized or are being treated for compensable defects as out-patients at the various hospitals or dispensaries, the treatment of refractive errors may be supplied, and tonsils may be removed, if it is considered by the attending physician or surgeon in charge to be a proper part or adjunct to the treatment of the conditions for which the claimant is under treatment as a compensable defect due to service.

It must be left to the discretion of those immediately in charge of the sick patient to determine whether correction of a congenital refractive error or removal of tonsils is necessary or properly contributory to the treatment of the condition for which authority has been given for hospital or other care.

In the future, this bureau will not authorize provision of glasses except as specified in the above memorandum. This applies to our

procedure from this date forward and does not affect authorization already issued, which must be honored.

Abbreviations used: T.P.—Temporary partial.

P.P.—Permanent partial.

P.T.—Permanent total.

#### EYE

(1) The ratings for refractive errors as herein stated are in all cases where visual acuity has been corrected with proper lenses. If due entirely to refractive errors, no rating should be awarded for any defect in visual acuity. Progressive high myopia with degenerative changes in the eye should be considered a disease and rated under Par. II.

(2) For the purpose of rating visual disabilities due to corrected refractive errors, 20/40 vision (Snellen's) in each eye shall be considered the minimum of *normal vision*, and vision of less than 10/200 in an eye will be considered as equivalent to total loss of vision in that eye. If due to an injury or disease originating during service, no rating should be awarded for any defect in visual acuity which is 10/20 or better in each eye, or can be corrected by glasses up to 10/20 or better in each eye.

(3) In determining whether the defect in the visual acuity is due in any way to an injury or disease originating during the service, the history of the case and the result of a complete ophthalmologic examination should be carefully considered and the Specialist's report confirmed by a Consultant Eye Specialist.

(4) If recorded on enlistment, or having history of injury pre-existing to enlistment, the following conditions may be considered as "Obviously apparent" on enlistment—External injuries or scars; organic disease in the interior of the eye, such as chorioiditis, optic atrophy, or possible lens changes.

(5) Functional loss of vision should be rated as less than 10 per cent whether in one or both eyes.

In functional visual defects it is necessary to take into account—

(a) Visual acuity.

(b) Field of vision.

(c) Binocular vision.

Errors of color and light sense, notwithstanding their rarity, are symptoms of lesions of the nervous system and should be taken into account in conference with the Neuro-psychiatric Section in the estimation of the disability due to these lesions.

Color blindness of congenital origin is not to be considered of service origin.

*Schedule of Permanent Ratings for Properly Corrected Refractive  
Errors in Vision*

<i>Other eye of or less than</i>	<i>Or less than</i>						
	10/200	10/200	20/200	20/100	20/70	20/50	20/40
10/200.....	100%	90%	80%	70%	60%	40%	30%
10/200.....							
10/200.....	90%	80%	70%	50%	45%	30%	25%
20/200.....	80%	70%	50%	40%	35%	25%	15%
20/100.....	70%	50%	40%	30%	25%	20%	10%
20/70.....	60%	45%	35%	25%	20%	15%	7%
20/50.....	40%	30%	25%	20%	15%	10%	5%
20/40.....	30%	25%	15%	10%	7%	5%	0%

To the above table of ratings, a certain percentage shall be added for special conditions enumerated as follows:

(a) Obliteration of direct vision (such as from corneal opacity, deformed pupils, central chorioiditis, lenticular opacity and retinal detachment):

For one Eye..... Add 10% permanent partial  
For both Eyes..... Add 20% permanent partial

(b) Extraction of lens:

For one Eye..... Add 15% permanent partial  
For both Eyes..... Add 30% permanent partial

In rating for extraction of lens either unilateral or bilateral the combined visual acuity for correction should be taken into account.

Provided, that part of the above percentages will not be added which will increase the total percentages to exceed 100 per cent; that no percentages for more than one of the above conditions will be added to the same case, and that no total percentages will be given for any of the above conditions which is in excess of that given for complete loss of sight in the affected eye.

It is necessary to establish a general rule:

(1) In each case where ocular functional troubles, without anatomical lesions of the eye or its adnexa, as evidenced by objective examination, can only be considered absolutely incurable when the central or peripheral vision is involved.

(2) It is also considered the same in all lesions as cataracts, retinal detachments, and ocular hemorrhages, in the stage of evolution.

*Blindness or Irremediable Loss of Sight*

In this category should be considered the absence or atrophy of the two globes, leucoma, cicatricial staphylomas occupying the greater



part of the corneas, complete atrophy of the optic nerve, extensive cicatricial lesions of the chorioretina in the region of the posterior pole and retinal detachment in the stage of evolution.

From a practical standpoint blindness can be considered to exist where the central vision of one eye equals 1/20 with a deficient visual field, the other being inferior to 1/20. . . . . 100 per cent.

In other words, 10/200 in one eye, and less than 10/200 with deficient visual fields. . . . . 100 per cent.

It is necessary to distinguish cases of loss of vision without apparent lesions, from loss of vision accompanied by mutilation such as enucleation, atrophy of globe and extensive staphylomas.

Lack of accommodation and convergence (according to Duane's table) . . . . .	P.P. 20%
Diplopia (uncorrectable) . . . . .	P.P. 30%
Loss of conjugate movement in both eyes or three movements in the seeing eye . . . . .	P.P. 50%
Permanent concentric contraction in field of vision in one eye to 10 per cent not subject to restoration by treatment . . .	P.P. 10%
Permanent concentric contraction in both fields to 60 per cent or loss of temporal halves . . . . .	P.P. 75%
Loss of nasal halves in both fields . . . . .	P.P. 50%
Homonymous hemianopsia, lateral, superior or inferior . . . .	P.P. 40%
Concentric contraction of both fields to 30 per cent . . . . .	P.P. 25%
Concentric contraction of both fields to 10 per cent of normal with retention of normal central vision . . . . .	P.P. 50%
Scotomas rated on interference with visual acuity:	
Color blindness . . . . .	P.P. 10%
Heterophoria to a degree sufficient to produce asthenopia . .	P.P. 10%
Nyctalopia (in proportion to degree of light sense) . . . . .	P.P. 20%
Retinitis pigmentosa. Rate on contraction of visual field and visual acuity.	

# 1. *Eye Lids:*

Infectious Processes and tumors	See <i>Face</i> .
Lagophthalmus . . . . .	P.P. 20%
Ectropion—Uncomplicated remediable . . . . .	Less than 10%
Entropion—Irremediable . . . . .	Less than 10% to 30%
	Permanent Partial.
Symblepharon—Complicated . . .	Rate on complications.
Epiphora—Remediable . . . . .	T.P. 10%
	Temporary Total if hospitalized.
Irremediable . . . . .	P.P. 10% for one eye.
	P.P. 15% for both eyes.

## Ptosis:

One Eye..... P.P. 15%.

Two Eyes..... P.P. 25%.

2. *Eye-Ball:*

- (a) Injuries, Infections and Inflammations (including Glaucoma, Keratitis, Iritis, Iridocyclitis, Uveitis, Scleritis, Pan-ophthalmitis.

Temporary Partial 10% to  
Temporary Total depending  
on clinical findings.

Sequelae—(Rate on Visual  
and Cosmetic Defects.)

## (b) Tumors:

Benign..... Rate on visual and cosmetic  
defects.

Malignant..... P.P. 10% to Permanent Total

Nystagmus..... Rate on Visual Defects.

- (c) Enucleation of eye-ball..... P.P. 40%.

## Traumatic Cataracts:

- (a) Non operable (the rating to depend upon degree of visual acuity)

- (b) Operable, or where the cataract is absorbed.

(If the vision is below that of the non-affected eye by reason of the impossibility of fusion of images, add 10 per cent if the total disability will not be more than the loss of vision of one eye.)

If the vision of the non-cataractous eye is worse or absent refer to the table of visual acuity, rating the aphakic eye according to the best optical correction.

Dislocation of the crystalline lens, intra-ocular hemorrhages, and detachment of the retina, causing different degrees of disability will be rated according to the degree of vision.

In all conditions involving the optic nerve the fields of vision must be recorded.

In conditions with diplopia muscles involved must be specified.

*Paralysis of Muscles of Eye*

Paralysis of muscles of only one eye..... P.P. 25%

Paralysis of muscles of one eye and one muscle in working eye. P.P. 35%

Paralysis of muscles of both eyes, working eye, three or more  
muscles..... P.P. 40 to 50%

Paralysis of all muscles of both or of working eye..... 100%

In all cases of total blindness where the claimant is in constant need of a nurse or attendant an additional rating of 20 per cent shall be had from the date of permanent and total blindness.

Complete loss of taste and smell . . . . .	P.P. 35%
Loss of taste . . . . .	P.P. 25%
Loss of smell . . . . .	P.P. 15%

*Note:* In all border line cases a conference should be held with the section within whose jurisdiction the disability is handled, and a combined rating arrived at to cover the disability.

#### EAR

##### (1) *Hearing:*

1. For the purpose of rating disabilities due to the defects in hearing 20/40 (viz., hearing of conversational voice at 20 feet with one ear closed and the back toward the examiner) in either ear shall be considered the maximum of normal hearing; and total deafness shall be considered to be a total loss of the bone conduction of sound.

2. Functional loss of hearing shall be rated less than 10 per cent for one or both sides.

3. Total loss of hearing with loss of bone conduction both ears, shall be rated Permanent Partial 65 per cent.

4. To guide Medical Referees in rating ear disabilities where treatment and corrective appliances are necessary, see ruling issued *re* eye cases.

#### *Mutilating Wounds, Scars and Subsequent Disfigurement and Plastic Operations*

The precise disability resulting from the destruction of the important special organs interfering with the motor or sensory functions will be accurately observed and rated. The position and extent of scars will be noted as well as any symptoms which they produce by interfering with the orifices, such as mouth, nostrils, external, auditory canal, esophagus, etc., or with the function of organs or all tissues. The condition of the scars, whether painful, inflamed, enlarged (keloid or vicious callus) should be rated.

In all cases where disfigurement is noted a non-retouched photograph, passport size, should be requested. All plastic operations with the after results should be carefully considered and the case rated accordingly.

In all cases where the loss or destruction of the part where the disability involves the rating by another section, a conference either by memo or by person should be obtained in order to avoid duplication of ratings.

Luetic and tubercular infections are not to be rated by the Eye, Ear Nose and Throat Medical Referees but shall be referred to the General Medicine and Tuberculosis Sections for a rating.

*Schedule of Permanent Ratings for Defects in Hearing of Organic Origin*

Other ear conduction	0 loss bone conduction	0 with bone conduction	1/40	5/40	10/40	20/40
	65%	55%	40%	25%	15%	15%
1/40	40%	35%	30%	15%	10%	10%
5/40	25%	20%	15%	12%	8%	7%
10/40	15%	12%	10%	8%	7%	5%
20/40	15%	12%	10%	7%	5%	0%

(1) *External Auditory Canal:*

Extent of disability based on the statement of medical facts.

Infectious processes . . . . . Less than 10%.

Temporary Total if hospitalized.  
Rate on hearing.(2) *Tympanic Membrane:*(3) *Middle Ear:*

Infectious processes—

Extent of disability based on the statement of medical facts.

(a) Otitis media, chronic,  
catarrhal . . . . . Less than 10%.(b) Otitis media, chronic non-  
suppurative . . . . . Less than 10%.(c) Otitis media chronic, sup-  
purative . . . . . T.P. 10%, one ear.  
T.P. 15%, both ears.(d) Mastoiditis, acute, if hos-  
pitalized . . . . . T.T.

(e) Mastoiditis, operated . . . . . Less than 10%.

(4) *Internal Ear* . . . . . Less than 10%, P.P. 65%.Based on degree of hearing  
and in conference with Neu-  
ropsychiatric Section.(5) *Tumors:*Benign, disfiguring . . . . . Rate equivalent to disfigure-  
ment.

Malignant:

Remediable . . . . . Temporary total.

Irremediable . . . . . Permanent total.

After effects of operation . . . . . Rate on disfigurement.

## NOSE AND ACCESSORY SINUSES

Loss of tip of nose exposing nares with-  
out destruction of bridge . . . . . P.P. 30%

Loss of nose with complete destruction of bridge.....	P.P. 75%
Deflected septum, non-obstructive.....	Less than 10%.
Deflected septum, obstructive.....	Rate on complications.
Hypertrophy of turbinates.....	Less than 10%.
Rhinitis:	
(a) Acute rhinitis.....	Less than 10%.
(b) Hypertrophic rhinitis.....	Less than 10%.
(c) Atrophic rhinitis.....	P.P. 10%.
(d) Chr. atrophic rhinitis with Ozena.	P.P. 10% to P.P. 35%.
Naso-pharyngeal catarrh.....	Less than 10%.
Perforation of nasal septum.....	Less than 10% to T.P. 10%.
	Loss of smell P.P. 15%.
Sinusitis, frontal, ethmoidal, antral—	
(a) Acute depending on clinical findings.....	T.P. 10% to Temporary Total
(b) Chronic.....	T.P. 10%.
	Temporary Total if hospitalized.
<i>Tumors:</i>	
(a) Benign, disfiguring.....	Rating equivalent to disfigurement.
(b) <i>Malignant:</i>	
Remediable.....	Temporary Total.
Irremediable.....	Permanent Total.
After effects of operation.....	Rate on disfigurement.

PHARYNX

1. Infectious Processes:

(a) Adenoids.....	Less than 10%.
(b) Acute Pharyngitis.....	Less than 10%.
(c) Chronic Pharyngitis.....	Less than 10%.
(d) Naso-pharyngeal catarrh.....	Less than 10%.
(e) Abscess.....	Temporary Total.

*Tumors:*

(a) Benign, disfiguring.....	Rating equivalent to disfigurement.
(b) Malignant—	
Remediable.....	Temporary Total.
Irremediable.....	Permanent Total.
After effects of operation.....	Rate on disfigurement.

## LARYNX AND TRACHEA

1. Infections (depending on clinical findings)..... Less than 10% to T.P. 10%.  
Injuries..... Temporary Total if hospitalized.
- Inflammations
2. Tumors:  
Remediable..... Permanent Total.  
Irremediable..... Temporary Total.
3. Loss of Speech:  
Functional..... Less than 10%.  
Partial..... Less than 10% to T.P. 10%.  
Organic:  
Remediable—  
Complete..... T.P. 50%.  
Partial..... Less than 10% to P.P. 10%.  
Irremediable—  
Complete..... P.P. 50%.
4. Stenosis—Remediable:  
Slight impediment to—  
Respiration..... Less than 10%.  
Moderate..... T.P. 10% to T.P. 50%.  
Difficult..... T.P. 50% to Temporary Total  
Irremediable..... Same as above rating, but  
Permanent Partial to Permanent Total.

(Permanent Total rating to be given only for Permanent Tracheotomy tube.)

## SURGERY OF HEAD AND NECK

*External Covering of Skull:*

1. Infectious Processes—  
(a) Active..... Less than 10%.  
Temporary Total if hospitalized.
- (b) Healed..... Rate on loss of substance and disfigurement.
2. Disfigurement..... Less than 10% P.P. to P.P. 30% depending on degree.
3. Benign Tumors and Cysts..... Less than 10%. After removal, a permanent partial rating, depending on degree of disfigurement.

4. Malignant Growths—

- (a) Remediable..... Temporary Total.
- (b) Irremediable..... Permanent Total.

*Cranial Bones:*

1. Infectious Processes—

- (a) Active..... T.P. 10%.  
Temporary Total if hospitalized.
- (b) Healed..... Rating dependent on loss of substance and disfigurement.

2. Loss of outer tables, uncomplicated.. Less than 10%.

*Loss of Skull Bone* (when accompanied by only slight symptoms such as occasional headache and occasional slight vertigo, ordinarily):

- (a) Loss of  $\frac{1}{2}$  square inch..... Less than 10%.
- (b) Loss of  $\frac{1}{2}$  to  $1\frac{1}{2}$  square inch.... T.P. 15%.
- (c) Loss of  $1\frac{1}{2}$  or more sq. in..... T.P. 10% for each square inch  
In conference with Neuro-psychiatric Medical References.

(d) Depressed fractures:

- Uncomplicated..... Less than 10%.
- Complicated..... Rate on complications.  
In conference with Neuro-psychiatric Medical References.

Tumors:

- (a) Benign..... Less than 10%.
- (b) Malignant—Remediable..... Permanent partial in proportion to loss of function and disfigurement.

Irremediable..... Permanent Total.

Alopecia areata..... T.P. 10%.

Alopecia, complete..... P.P. 15%.

Loss of eyebrows and eyelashes..... P.P. 25%.

*Face:*

1. Irremediable scars of face or neck, with deformity of a lip or eyelid:

- (a) Slight..... Less than 10%.
- (b) Moderate..... P.P. 10%.
- (c) Severe..... P.P. 25%.
- (d) Complete deformity of one side of face..... Permanent Total.

2. Irremediable scars of face or neck not deforming lips or eyelid and not limiting motion of head:
  - (a) Slight..... Less than 10%.
  - (b) Moderate..... P.P. 10%.
  - (c) Severe without bone involvement. P.P. 10% to P.P. 25%.
3. Injuries of Auricle:
  - Severe deformity of auricle with marked loss of substance..... P.P. 15%
  - Loss of one auricle..... P.P. 20%.
  - Loss of both auricles..... P.P. 50%.
4. Tumors:
  - Benign, disfiguring..... A permanent partial rating equivalent to disfigurement.
  - Malignant:
    - Remediable..... Temporary Total.
    - After effects of operation..... Rate on disfigurement.
    - Irremediable..... Permanent Total.
5. Infectious Processes:
  - Acute..... Less than 10%.
  - ..... Temporary Total if hospitalized.
  - Healed..... Rate on disfigurement.
6. Loss of Upper Maxilla:
  - Hard palate, complete..... P.P. 40%.
  - Hard palate, partial..... P.P. 15% to P.P. 30%.
  - Alveolar, Ridge..... P.P. 10% to P.P. 50%.
  - ..... (See Dental.)
7. Loss of Lower Maxilla (consider also facial disfigurement):
  - Complete between angles..... Permanent Total.
  - One half loss of..... P.P. 50% to P.T. (See Dental.)

## GREAT BRITAIN

HOME OFFICE, WHITEHALL

13th July, 1921.

SIR:

I am directed by the Secretary of State to refer to your letter of the 31st of March addressed to the Ministry of Health, requesting to be furnished with particulars relating to eye injuries, and to say that there are no rules or tables of disability ratings in use in the Department. I am to forward the enclosed publications and statistics which it is hoped will be of assistance to you.

1. Explanatory Memorandum on the Workman's Compensation Act, 1906.
2. The Schedule of Industrial Diseases.



## Ratings for Eye, Ear, Nose and Throat Disabilities 61

3. Statistics showing the number of cases of the various industrial diseases in which compensation has in recent years been paid.
4. Statistics showing the number of accidents affecting the eye which have been reported under the Factory Acts.

I am, Sir,

Your Obedient Servant,

DR. H. V. WURDEMAN, C. J. MARKBREITER.

709 Cobb Building,  
Seattle, Wn., U. S. A.

### WORKMAN'S COMPENSATION. STATISTICS OF COMPENSATION

Cases of Industrial Disease for which compensation was paid.

(A) Cases continued from previous years.

(B) Cases in which first payment of compensation was made during the year.

		1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Nystagmus.....	A	662	1144	1819	2149	3218	.....	2745	2579	2550	3731
	B	956	1375	1376	2402	2775	.....	1450	1324	1780	2718
Cataract in glass	A	1	.....	.....	.....	1	.....	.....	.....	.....	.....
workers.....	B	2	3	1	1	4	.....	.....	.....	.....	1
Ulceration of the	A	.....	.....	.....	.....	.....	.....	.....	.....	2	.....
corneal surface of		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
the eye.....	B	.....	.....	.....	.....	.....	.....	.....	.....	20	1

First scheduled in 1916.

Note. These figures are compiled from returns from (a) insurance companies which handle this type of business; (b) employers who insure privately. The figures for 1916, 1917 and 1918 cover (a) alone.

### FACTORY DEPARTMENT

Accidents reported under the Factory and Workshop Acts to Certifying Factory Surgeons: United Kingdom.

	Loss of sight of one or both eyes					Accidents resulting in other injury to eyes				
	1910	1911	1912	1913	1914	1910	1911	1912	1913	1914
Adults (over 18)										
Males.....	49	48	48	79	48	1711	1848	1858	2075	1991
Females.....	7	8	6	4	2	63	68	71	58	54
Young Persons (13-18)										
Males.....	6	6	7	15	7	243	283	327	366	375
Females.....	1	1	.....	7	2	26	21	21	16	21
Children (12-14)										
Males.....	.....	.....	.....	.....	.....	.....	1	.....	3	2
Females.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1
Total.....	63	63	61	105	59	2044	2221	2277	2518	2444

There are no later figures corresponding to the above.

## FRANCE

(Translation)

MINISTER OF LABOR

Republic of France,  
Paris, March 17, 1921,  
80, rue de Varenne (7e)

## SERVICE INSURANCE DEPARTMENT

Monsieur: In response of your desire, expressed to me, I have the honor of sending you with this, extracts from the schedules for disability established by the decree of May 29, 1919, as applied to our law of March 31, 1919, concerning the wounded of the war, which is especially adapted to accidents affecting the eye, ear, larynx and pharynx. There is no official schedule for labor accidents. These incapacities are arbitrarily adjudged by the experts. On account of this I am unable to submit to you all of the information and tables that you desire.

Receive, Sir, the assurance of my perfect consideration.

(Sig.) SUMMEN,

*The Minister of Labor by author-  
ization of the Judicial Counsel,  
Chief of Service.*

TO MONSIEUR HARRY VANDERBILT WÜRDEMANN,  
*Cobb Building, Seattle, Washington.*

*Extract from schedule of ratings for disability established by the decree of  
May 29, 1919, for application to our law of March 31, 1919, for war  
injuries.*

## VII. EYES

It is necessary to establish general schedules.

1. In each case of functional ocular affection without anatomic lesions of the eye and its adnexa appreciable by objective examination, which is not to be considered absolutely incurable, which affect the central or peripheral vision.

2. It is the same with such lesions as cataract, detachment of the retina, ocular haemorrhage, etc., which may proceed.

3. In functional visual affections it is necessary to express:

- (a) the central vision (visual acuity);
- (b) the peripheral vision (visual field);
- (c) the binocular vision.

The affections of the chromatic and light senses, which are very rare, are symptoms of lesions of the sensory nerve apparatus. They are to be considered with the other lesions.

I. Blindness or irremedial loss of vision.

In this category and case: absence or atrophy of both globes, the leucomas and the cicatricial staphylomas occupying the greater part of the cornea, complete atrophy of the optic nerve, profound cicatricial lesions of the chorioid and retina in the posterior pole, detachment of the retina in the latter stages.

Practically there is considered as partial blindness all those defects which affect the sense of vision or the visual field a twentieth part.

II. Total loss of vision in one eye, the other not being affected should be considered by the loss of vision without apparent lesion and cases of mutilation (enucleation, excentration, atrophy of the globe, extensive staphylomas).

(a) Loss of vision of one eye without apparent deformity, 25 p. 100.

(b) Ablation or atrophy of the globe with deformity by permanent protheses, 30 p. 100.

(c) With cicatricial lesion not permitting the use of an artificial eye, 40 p. 100.

III. Central vision, reduction or loss of the visual acuity in the two eyes. The visual acuity is not estimated which takes count of optic correction by spheres, cylinders or spherocylinders. All the procedures usually employed to determine simulation or exaggeration are to be used in the functional examination.

TABLE I

Visual acuity	to 5/10	4/10 or 3/10	2/10	1/10	1/15 to 1/20	Less than 1/20 to 0	Apparent deformities with or without prothesis
1 to 5/10.....	0	5	10	15	20	25	30 to 40
4/10 to 3/10....	5	10 to 15	15 to 20	25 to 30	30 to 35	40 to 45	45 to 50
2/10.....	10	15 to 20	45	50	55 to 60	60 to 70	75 to 80
1/10.....	15	25 to 30	50	65	70 to 80	85	90 to 95
1/15 to 1/20....	20	30 to 35	55 to 60	70 to 80	85 to 90	90 to 95	100
Apparent deformities with or without prothesis.....	.....	45 to 50	75 to 80	90 to 95	100	100	100

*Note.*—The percentages are established from 10 to 100 per cent; 100 per cent is considered total disability.

In most of the former schedules the absolute disability for the blind was considered 125 per cent and the tables were made in proportion.

#### *IV. Peripheral Vision—Visual Field*

Concentric contraction of the visual field.

A 30°

One eye..... 0 p. 100  
The two eyes..... 20

Less than 10%:

One eye..... 10  
The two eyes..... 70 to 80

Central scotoma of considerable extent:

One eye..... 15 to 25  
The two eyes..... 70 to 100

Heminopsias, implying loss of symmetrical vision in two portions of the visual fields of either eye, with conservation of the central vision.

Vertical heminopsias:

Homonymous, right or left . . . . .	25 p. 100
Heteronymous nasal exceptions . . . . .	10
Heteronymous temporal exceptions . . . . .	40

Horizontal heminopsias:

Superior . . . . .	10
Inferior . . . . .	50
Heminopsias in quadrant . . . . .	10

Cases of heminopsias which affect both horizontal and vertical or three quadrants of the visual field are obscure.

Heminopsias with loss of central vision of one side or both, refer to the table above, the total amount not to be more than 100 per cent.

*Note.*—Subjective examinations should be made on account of simulation or exaggeration, also at intervals of days.

#### *V. Binocular Vision*

The function of equilibration which permits the two eyes to fix on the same object is equal on both sides. The diplopia is produced by paralysis of the excentric ocular muscles involving one or several. Diplopia making it necessary to cover one eye, 25 p. 100.

#### *VI. Other Ocular Affections*

Paralysis of accommodation of the sphincter of the iris.

Ophthalmoplegia interna unilateral . . . . .	5 to 10 p. 100
Ophthalmoplegia interna bilateral . . . . .	10 to 20 p. 100

#### *Traumatic Cataracts*

(a) Nonoperable (amount depending upon the extent of visual acuity);

(b) Eye operated on having the cataract resorbed.

If the vision is inferior to the eye which is not wounded, on account of the impossibility of making fusion of the images, allow 10 p. 100, in the extent of 25 p. 100 when the vision of the eye is lost.

*Example:*

V. O. D. (healthy)—1;	
V. O. G. (operated)—1 to 5/10—10 D. . . . .	10 p. 100
V. O. D. (healthy)—1;	
V. O. G. (operated)—1/10 below—10 D. . . . .	25 p. 100

If the vision of the noncataractous eye is worse or absent, give optical correction of the aphakic eye.

The luxation of the crystalline lens, the intra-ocular hemorrhages, the detachment of the retina are susceptible of modification, and, therefore, should be estimated upon the degree of vision.

*Ocular Adnexa*

(a) Bony orbit.

Destruction of one part of the orbit and its contents comprising the eye, severe lesions of the periorbital sinus and the nasal fossae, mutilation requiring restoration or prosthesis..... 50 to 70 p. 100

Motor nerves:

Paralysis of one or several muscles (diplopia)..... 25 p. 100

Sensative nerves:

Neuritis albor and tics douloureux..... 15 to 25

Paralysis of the fifth pair, trophic troubles (syndrome neuro-paralytique).

Vascular alterations of the veins or arteries (aneurisms, pulsating tumor of the orbit) following functional trouble..... 20 to 60 p. 100

(b) Lids.

Most of the lid affections are curable by operation.

Destruction of the lids (entropion, trichiasis, ectropion, cicatrices vicious, symblepharon and ankyloblepharon) are to be corrected and adjudged according to the diminution of the visual acuity 0 to 10 p. 100.

Ptosis, curable by operation, otherwise to be judged on whether or not the pupil can be uncovered, depending upon the per cent:

One eye..... 10 to 20 p. 100

The two eyes..... 40 to 70

Lagophthalmos with facial paralysis:

One eye, depending upon the complications..... 10 to 20

The two eyes, depending upon the complications..... 30 to 50

(c) Lachrymal passages.

Epiphora..... 0 to 10

Fistula with lesions of the bones:

Unilateral..... 20

Bilateral..... 40

IX. EARS

A. Loss of use, deformity of the ear without lesion of the auditory canal.

(a) Unilateral..... 5 p. 100

(b) Bilateral..... 10 p. 100

B. Loss of the ear with stenosis of the auditory canal.

See above for the corresponding concomitant diminution or supression of the acuity.

*Middle and Internal Ear*

(a) Good hearing:

Whisper heard at 50 centimeters.

Voice heard at 5 meters.

## (b) Partial deafness:

Whisper heard at 12 centimeters.

Voice heard at 1 meter 25 centimeters.

## (c) Total deafness:

Whisper or voice not heard.

## (b) Partial deafness:

(b') unilateral..... 5 to 10 p. 100

(b'') bilateral..... 15 to 45 p. 100

## (c) Total deafness:

(c') unilateral..... 20

(c'') bilateral..... 6

Total deafness on one side and partial on the other 30 to 50 p. 100

(This table is the same as the table of Pythagoris)

<i>Whispering Voice</i> <sup>1</sup>	<i>Valuation of the Auditory Acuity</i>				
	48 cm.	24 cm.	12 cm.	6 cm.	3 cm.
48 centimeters.....	0	5	10	15	20
24 centimeters.....	10	15	20	25	30
12 centimeters.....		20	30	35	40
6 centimeters.....			30	45	50
3 centimeters.....				45	60

NOTE.—The figures in centimeters indicate the distances; therefore, it is preserved.

*Osteomyelitis*

Chronic suppuration with temporal fistula through the ear (curable by operation) otherwise see osteomyelitis.

Tuberculosis otitis of the temporal bone..... 30 to 50 p. 100

In cases with deafness or facial paralysis concomitant (see notes).

*Vertigo*

Labyrinthine traumatic vertigo should not be confounded with brain disease consecutive to traumatism.

Labyrinthine vertigo of two characters, subjective and observable are compared:

(a) Sensation of rotation involving surrounding objects;

(b) Tendency to falling.

Crossed vertigo generally disappears after the traumatism. If otherwise at a certain time the subject complains of vertiginous symptoms. Examination should be made by the five following tests: standing; walking; electrically; rotary; caloric.

To prove the extent of the vertigo, two or three tests at least should be made to show a positive result, otherwise the patient may not be vertiginous enough to admit of disability.

‡ In the true cases depending upon the tendency and the frequency..... 10 to 30 p. 100

<sup>1</sup> Double the distances in case loud voice is used.

*Tinnitus*

The tinnitus is a subjective sounding which cannot be estimated by the expert. One is only able to establish the facts from the patient, and the degree of the deafness. In consequence of this it cannot be estimated as a disability.

XIII. LARYNX

Cicatricial contraction of the larynx gives the consequence of dysphonia or dyspnoea.

They vary and in general are parallel, but one may exist without the other.

A. In cases where the trouble is isolated:

- (a) Dysphonia, sonorous voice, the voice of a pedlar,  
also a whispering voice..... 50 to 20 p. 100
- (b) Dyspnoea b' simple dyspnoea of effort..... 10
- (Dyspnoea b'') following fatigue..... 30
- (Dyspnoea b' ') intense, necessitating a tracheal canula 50
- (b) In cases where the trouble is associated..... 15 to 60

*Paralysis*

The traumatic paralysees of the larynx, associated or not, with paralysis of the voice or the palate or the shoulder are extremely rare. If in any case they are incurable, they should be valued at the rating above given for dysphonia and dyspnoea.

*Tuberculosis of the Larynx*

- (a) Voice coarse (form of catarrh)..... 20 p. 100
- (b) Aphonia with limited lesions of the cords..... 50
- (c) Dysphagia with or without aphonia..... 90
- (d) Dyspnoea, stenosis tracheotomy..... 100

XIV. PHARYNX

A. Stricture of the lower pharynx: oesophagus.

- (a') Cicatricial pharynx affecting deglutation..... 10 to 30 p. 100
- (a'') Traumatic stricture of the oesophagus..... 20 to 50 p. 100
- (a''') Oesophageal fistula, depending upon its size and  
often combined with stricture (curable by operation), otherwise..... 10 to 30 p. 100

B. Stricture or occlusion of the superior pharynx.

- Isthmus naso-pharynx with adherences of the palate to  
the vertebral wall..... 15 to 40 p. 100
- In case the deafness increases the disability may be in-  
creased to the maximum..... 60 p. 100

ITALY

(Translation)

Minister of Labor and Social Accident Prevention. May 10, 1921.

DIRECTOR GENERAL OF ACCIDENT PREVENTION.

This minister is sorry to be unable to furnish full official data as requested in the letter mentioned below.

However, I herewith forward pamphlet of the review of social accident prevention of Sept., 1920, in which are considered the principal lesions of the auditory apparatus and of the nose.

In so far as concerns Ophthalmology, you would secure important information by the scientific discussion held in the recent Italian Congress of Eye Injuries from the description that is given in the March volume of the above mentioned review.

I promise to forward you as soon as published, the May copy of the review mentioned, which will contain a full review of the second part of the proceedings of the Congress.

With consideration,

THE MINISTER,  
(Sig.) MALAMA.

SIG. HARRY VANDERBILT WÜRDEMAN, *W*  
*Major, M. R. C., U. S. A.,*  
*Cobb Bldg., Seattle, Wn.*

Minister of Labor and Social Accident Prevention *Rome, July 7, 1921.*  
Director General of Accident Prevention.

Following my letter of last May 10, No. 4739, and in answer to your letter above mentioned, I herewith enclose the May copy of the review of Social Accident Prevention which contains the proceedings of the first National Congress of Eye Injuries, with the privilege of forwarding further numbers that may treat of the subject at issue.

Respectfully,

THE MINISTER,  
(Sig.) MALAMA.

SIG. HARRY VANDERBILT WÜRDEMAN, *W*  
*Major, M. R. C., U. S. A.,*  
*Cobb Bldg., Seattle, Wn.*

#### FIRST NATIONAL CONGRESS OF EYE INJURIES

The conclusions of the commission can be grouped as follows:

1. At first the commission has recognized the necessity of limiting the tables to cases of diminution of the acuteness of vision, i.e., those injuries that represent by themselves only the major part of the damage to the working visual capacity. It being understood that the anatomical functional collateral alterations closely limited to the reduction of the acuteness of vision are included in the valuation of these reductions.

Those approved are, therefore, based valuations that could undergo amendments. In so far as the functional adoption of doing work, functional alterations of importance more closely connected, are influencing the diminution of the acuteness of vision, inducing larger reductions of the faculty of vision. In fact, in so far as the reduction of the visual field, it is not necessary to hold them important as increasing the valuation of the reduction of the acuteness of vision, as these are based on a valuation of 35 per cent for the loss of an eye, which include also the valuation of the damage determined from the corresponding reduction of the visual field, so that counting their increase in the per cent for such reductions would cause it to be counted twice in determining the



amount of damage of the capacity of vision as regards the amount of effective work.

2. In the second place the Commission holds itself to the theme of the Congress as covering the ground of questions coming up incidentally in the discussion of this subject, i.e., of the damage determined from the reductions from the capacity of vision in one eye, or the damage resulting from the reduction of the capacity of vision already below the average, these cases being contemplated in the subject (conditions pre-existing that are additional causes of incapacity). In fact the valuations that follow regard simply the cases in which subjects prove a single accident based on the functional alterations hereinafter indicated.

3. The Commission has also held that it being the intention to formulate a table to apply in the present legislative regime in which no account is held as to the occupation of the injured one in determining his damage by referring the ocular damage to a single valuation of 35 per cent, for the anatomical or functional loss of an eye would not be proper in following the tendency expressed by some objectionist for a valuation differentiated from the various damages in the various types of work, a tendency that the Congress did not accept in the discussion of this subject, even voting on the question and discussing the subject IV, which was taken as a base for a modification of the law.

4. The Commission has adopted the following subdivisions of injuries, as proposed by Valenti, distinguishing four conditions:

I. Lesions reducing the vision in one eye only.

II. Lesions reducing equally the vision of both eyes.

III. Lesions reducing in unequal proportions the vision of both eyes.

IV. Lesions that abolish the capacity of vision in one eye and reduce in various amounts the vision of the other.

5. The reduction of vision in one eye only.

(a) Vision of  $\frac{6}{10}$  is considered as the minimum damage to the working capacity as by a loss, i.e., of 5 per cent; the reduction of vision superior to  $\frac{6}{10}$  ( $\frac{7}{10}$ ,  $\frac{8}{10}$ ,  $\frac{9}{10}$ ) or in cases of damage valued from the working capacity.

(b) Vision of  $\frac{1}{20}$  is considered as the minimum that allows a capacity for working vision; vision of one eye inferior to this is considered equal to blindness and is, therefore, valued as an incapacity of 35 per cent.

(c) Intermediate vision, between these amounts, of one alone should be valued progressively in a certain decimal per cent of the vision; in the higher vision that which would correspond with the per cent of incapacity, but less high than for the decimal proportions lost in the lower vision; by giving a little working margin the opportunity of using round figures of easier application and the differences that might result from applications of a progressive valuation, it was decided to adopt the following intermediary percentage:

Reduction of vision of one eye: to  $\frac{5}{10}$  equals 10 per cent; to  $\frac{4}{10}$  equals 15 per cent; to  $\frac{3}{10}$  equals 20 per cent; to  $\frac{2}{10}$  equals 25 per cent; to  $\frac{1}{10}$  equals 30 per cent; to  $\frac{1}{20}$  equals 33 per cent.

6. In the reduction of the both eyes equally:

(a) Vision of  $7/10$  corresponds to a minimum vision of 5 per cent.

(b) Vision of  $1/20$  corresponds to the minimum of visual capacity utilizable for efficient work, i.e., an incapacity of 95 per cent.

(c) For intermediary vision, it is possible to use the following scale in a progressive manner: Vision in both eyes,  $6/10$  equals 10 per cent;  $5/10$  equals 20 per cent;  $4/10$  equals 30 per cent;  $3/10$  equals 45 per cent;  $2/10$  equals 60 per cent;  $1/10$  equals 75 per cent.

7. In cases of unequal reduction of binocular vision, we consider the vision most useful for the subject is that of the eye less injured, and that, therefore, a base for the valuation must be that of the retention of the binocular reduction equal to the vision of the eye less damaged. It is evident that one must make a valuation of the damage higher than that taken as a base, and it is also clear that one cannot make a valuation that approaches that of cases of binocular vision corresponding to the eye most damaged. For simplicity in calculation that would feature the uniformity of a valuation criterion, it was decided that it should be made the midpoint between the valuation corresponding to the equal binocular reduction of both eyes, so that in case of vision in O. D.  $5/10$ ; in O. S.  $1/10$ , one would take the midpoint of the valuations of the monocular vision equal to  $5/10$  and  $1/10$ , i.e., 20 per cent and 75 per cent. The indemnity damage resulting would be 47.5 per cent.

This method apparently will give adequate valuations in cases with a notable difference between the vision in two eyes, when there is an absence of binocular vision.

Note the valuation eventually that of the loss in one eye and reduction of the other to a vision at the highest point of the two eyes, so it can only be verified with a certain arithmetical calculation when the vision in one of the two eyes is of  $1/20$ , and the other superior to  $3/10$ ; in such cases one applies the valuation on the hypothesis of the loss of one eye and reduction of the other to the amount less damaged as in the fourth case herein described.

8. In cases of blindness of one eye or reduction of vision in the other.

(a) The monocular vision  $8/10$  would correspond to damage immediately superior to the loss of an eye, i.e., 40 per cent.

(b) Monocular vision of  $1/10$  corresponding to the minimum of utilizable capacity for vision for efficient work, i.e., in damage of 95 per cent.

(c) For monocular vision intermediary the following scale should be adopted: Vision of  $7/10$  equals 45 per cent;  $6/10$  equals 50 per cent;  $5/10$  equals 55 per cent;  $4/10$  equals 60 per cent;  $3/10$  equals 70 per cent;  $2/10$  equals 80 per cent.

The conclusions of the Commission, after brief discussion, were approved unanimously.

They may be readily ascertained in the following two tables.

A. TABLE APPROVED BY THE CONGRESS

Vision	Monocular reduction, percentage	Equal binocular reduction, percentage	Blindness of one eye and reduction of other, percentage	Unequal binocular reduction
1	2	3	4	5
9/10	0	0	35	Arithmetical medium between the two valuations indicated in column three for vision of either of the two eyes in such a way as to extend, in cases in which one of the two eyes have a vision of 1/20, the per cent indicated in column four for the vision of the other eye.
8/10	0	0	40	
7/10	0	5	45	
6/10	5	10	50	
5/10	10	20	55	
4/10	15	30	60	
3/10	20	45	70	
2/10	25	60	80	
1/10	30	75	95	
1/20	33	95	100	
1/20	35	100	100	

B. SYNOPSIS OF THE VALUATION OF THE REDUCTION OF THE ACUTENESS OF VISION

Vision	9/10	8/10	7/10	6/10	5/10	4/10	3/10	2/10	1/10	1/20	1/25
O. D.											-0
Vision											
O. S.											
9/10	0	0	0	5	10	15	20	25	30	33	35
8/10	0	0	0	6	10	15	22.5	30	37.5	40	40
7/10	0	0	5	7.5	12.5	17.5	25	32.5	40	45	45
6/10	5	5	7.5	10	15	20	27.5	35	42.5	50	50
5/10	10	10	12.5	15	20	25	32.5	40	47.5	55	55
4/10	15	15	17.5	20	25	30	37.5	45	52.5	60	60
3/10	20	22.5	25	27.5	32.5	37.5	45	52.5	60	70	70
2/10	25	30	32.5	35	40	45	52.5	60	67.5	77.5	80
1/12	30	37.5	40	42.5	47.5	52.5	60	67.5	75	85	95
1/20	33	40	45	50	55	60	70	77.5	85	95	100
1/25-0	35	40	45	50	55	60	70	80	95	100	100

*Damage to the Ear and Nose*

(Review of the Social Accident Prevention, Sept., 1920)

On Anosmia see the report to the Society of Injuries and the Military Legal Medicine.

Tinnitus of high degree 10 per cent.

Unilateral Deafness 20 per cent.

Bilateral tinnitus of medium degree 20 to 40 per cent, conceding it 40 per cent when the auditory acuteness is of only one meter for the bilateral whispering voice.

Tinnitus bilateral of high degree 30 per cent.

According to Remy:

Crushing of the nose through fracture.....	8%
Crushing with respiratory disturbances through deviation of the septum.....	0 to 5%
Unilateral nasal stenosis.....	0%
Bilateral stenosis.....	5 to 10%
Loss of smell.....	0%

According to Vibert:

Unilateral and bilateral obliteration of the nasal fossa through fracture of the nasal bone.....	3 to 4%
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According to Chavanne:

Complete unilateral nasal obstructions.....	5%
Complete bilateral nasal obstructions.....	25%

According to Caldera and Balla:

Cicatricial stenosis of one nares.....	3 to 5%
Cicatricial stenosis of both nares.....	7 to 15%
Nasal obstructions that impede nasal respiration of above 50 per cent.....	3 to 10%
and that give absolute imperviousness.....	10 to 30%
Perforation or hematoma of the septum.....	3 to 10%
Traumatic sinusitis from secondary infection.....	20%

#### GERMANY

(Translation)

The Imperial Insurance Department. *Berlin, West 10, June 8, 1921.*

DEAR SIR:

The Industrial Insurance Department at Berlin was merged into the Imperial Insurance Department on February 12, 1921. The Imperial Insurance Department is sorry that they cannot give all the information that you request on account of not having control over the medical services rendered the accident cases. We can only give the following information:

The percentage of the various kinds of accidents in trades vary according to the kind of trade, and for these we have no authentic data. There are, however, a number of communications in the literature. What we have of the official register will be found in the report of the insurance office from 1886 to 1912, particularly on page 443 and following. Especially will be found some statistics for the year 1917 (published in Berlin, 1910, for Verlag Von Behrend & Co.), relating to injuries of the eye from burns and caustics and scalding.

1. There are 30 and 100 of wounds and crushes, etc., 5.02 and 100 of other injuries coming to the eyes. Of these 61.45 per cent have retained foreign bodies. Seven cases, i.e., 0.16 per cent of all eyes injuries become total blindness. 303 cases, i.e., 6.78 per cent in the right and 314, i.e., 7.03 per cent in the left. Other private material may be found in the following writings:

1. Leitfaden für Bergutachtung und Berechnung von Unfallbeschädigungen der Augen von Dr. H. Magnus—Breslau, 1894. J. N. Kerns Verlag. (Max Muller).

2. Die Augenärztliche Unfallpraxis. Ein Hilfsbuch für die Feststellung der Unfall-Erkrankungen des Auges und der Unfall-Renton von Dr. Max Maschke, Wiesbaden. Verlag von J. F. Bergmann, 1899.

3. Die Unfallentschädigung in der Augenheilkunde. Von Th. Axenfeld, Lausanne. Druck von Georg Bridel & Co.

4. Die beruflichen Augenverletzungen der Bergleute in einem fünfjährigen Zeitraum. von Dr. Joh. Ohm, Leipzig. Verlag von F. C. W. Vogel, 1914.

To: Harry Vanderbilt Würdemann,  
709 Cobb Bldg., Seattle, Wn.

BELGIUM

(Translation)

Minister of Industry,  
Labor and Recruiting.  
Office of Insurance and  
Social Welfare.

MONSIEUR DOCTOR:

In response to your letter of the 6th instant, I have the honor to submit the following:

1. There is no official scale for disabilities from accidents occurring in vocations.

The percentage is determined by the judge from the medical reports, in which the kind of work and the age of the injured person is considered. Monsieur Leon in his commentary upon the law of 1903 established an approximate scale which varies in each case, depending upon the opinion of the judges.

2. I regret that we are unable to furnish all the information requested. We have no industrial bureau in the sense that Monsieur Dr. Würdemann means. In case you wish any further explanations, I will try to give you satisfaction.

You will agree Monsieur Doctor with the assurance of my perfect consideration.

THE DIRECTOR-GENERAL TO MARCEL DANIS,  
(Sig.) CHEATE.

To: Dr. Harry Vanderbilt Würdemann,  
709 Cobb Bldg., Seattle, Washington.



# A PLAN FOR THE CONSERVATION OF HEALTH OF MALES WITHIN THE SECOND DECADE OF LIFE IN RELATION TO MILITARY DEFENSE

HONORABLE MENTION, WELLCOME PRIZE ESSAY, 1921

BY CAPTAIN WILLIAM S. DOW

*Medical Corps, United States Army*

"FUNDAMENTAL qualifications of a soldier consist of good vision and hearing, heart competent to stand the stress of physical exertion, intelligence enough to understand and execute military maneuvers, obey commands and protect himself, able to transport himself by marching as the exigencies of military life may demand." (Army Reg.) "He must have sound feet and a body capable of standing great mechanical stress, and one in which the sense organs, the central nervous system, and the organs of emotional control are as active as possible." (War Department Report of the defects found in drafted men, 1920.)

Contained in the above two sentences is found the ideal for which we must ever strive to attain.

In considering the subject of the conservation of the health of the youths, it would be well to answer the following questions: Is there a real need for this conservation? What is being done at the present time to bring it about? How is it being done? How can we aid in this conservation?

Before the examination of the men selected to serve in our National Army, very few, if any, of the medical profession had any idea that one-third of those examined would be found unfit for military service. It generally takes some great jolt like this to awaken us, and our only hope is that we will attempt to remedy this condition instead of dropping back again into the same old rut of indifference.

The defects found in the drafted men are grouped as follows:

	<i>Per cent</i>		<i>Per cent</i>
Mechanical defects.....	39.0	Tubercular.....	5.4
Sense organs.....	12.0	Mental and nervous.....	5.0
Cardiac and vascular.....	10.0	Skin lesions.....	3.0
Developmental and metabolic....	10.0	Respiratory (other than tubercular)	3.0
Venereal.....	5.8	All others.....	6.8

The percentage used is that per cent of all defects found.

Not only in our own country but in most of the others as well, they found the same condition. Lloyd George in an address at Manchester, England, given in August, 1918, said that if Great Britain had been

looking after the health of her people for the past twenty-five years, as she should have done, they would have had 1,000,000 more men to put in the field in 1917. The Germans never would have reached Amiens, and the war would have been over months before it was finished.

Lately in England, there has been created a Ministry of Health and the recognition of all public health activities unified under a central control. This brought about a change in the relationship of the British school medical service to that of the National Health Administration. However, under terms of the act, the Board of Education still remains the responsible agent for receiving and approving schemes of the local educational authorities and for the payment of grants in respect to such schemes. They realize that all measures for the promoting of the healthy physical and mental development of children, to be efficient, must be closely coordinated and developed under a common policy. The Ministry regulates the following: (a) Medical inspection and treatment of children in the public schools; (b) provision for meals; (c) schools for deaf and blind defectives, also epileptics; (d) organization and supervision of physical training in the public elementary schools; (e) evening play centers. The medical inspector has medical supervision of the children, oversees the provisions of the meals, and the physical training.

France, too, realizes the same defects in her people. Last year the Medical Faculty of the University of Paris organized a course in physical education. This year (1921) the French legislature passed a law making physical training and military preparation compulsory. The Undersecretary of State Technical Training is in charge of the work and is called the "Sports Minister." A committee is studying physical training, professional preadaptation, and the correction of occupational deformities. The adult worker, as well as the young, will be trained.

In Germany the new government has a council on physical education to deal with the question. As the universal military training is denied them, their problem was to develop a system of physical training which would give the children the same benefit that the exercises in military training gave their young men in the past.

This council has drafted a bill in regard to compulsory physical training of the youth which contains among other things the following provisions:

1. Every citizen of Germany, from the beginning of the school age until he reaches his majority, shall participate in exercises for physical training.

2. Facilities for the performance of this duty shall be furnished by the institution for public instruction in which the physical training shall

be adopted into the regular course of instruction and constitute a part thereof.

3. This duty shall be performed in gymnastic clubs devoted to various kinds of sports, provided that they have been recognized by the superior administrative council as conducive to the public welfare, or by participating in regular exercises. With the completion of the twenty-fifth year, a German citizen must present a certificate containing evidence as to the fulfilment of the duty of participating in the physical training, before he will be allowed to fill certain positions or practice a profession.

The school children of Japan are compelled to take gymnastic work between the ages of six and fourteen. There were 5,729,417 boys between the ages of ten and twenty in Japan in the year 1917. Military drill is compulsory in the secondary schools throughout the five-year course. Individual and sectional drill without arms is given in the first year. The same is given in the second year with the addition of company drill. The remaining three years, drill with arms, together with training in the practice of giving commands, is taught. The military training is carried into the high schools. The Japanese authorities lay emphasis in movements of the classes as a whole or team play instead of the individual performance. Wrestling is the most popular exercise. At present, almost all of the Japanese schools of the secondary grades and above practice the jiu-jitsu as one of the methods of physical exercises.

A health survey of Japanese students in the government institutes (as the Imperial University, the high schools, and the professional schools) gives the following data:

<i>Number of students</i>		<i>Eyes</i>				
<i>Year</i>	<i>examined</i>	<i>Robust</i>	<i>Medium</i>	<i>Weak</i>	<i>Normal</i>	<i>Abnormal</i>
1916-17.....	21,937	55.9%	43.0%	1.1%	56.4%	43.6%
1917-18.....	22,031	57.6	41.3	1.1	56.0	44.0
In the elementary schools they found						
1917-18 ...	1,391,378	52.91	43.59	3.50	78.24	21.76

As this article in the Year Book of Japan did not tell what defects were noted, we cannot compare their percentage with ours.

In ancient Greece the Athenian father was required to provide his son with instruction in music and gymnastics. The teacher of gymnastics strove to comprehend the normal functions of the body, while the physician studied the value of gymnastics for a healthy physique and took from his knowledge of anatomic physiology the standard for estimating the possibilities of the individual. With the endeavor of



physical invigorating by daily gymnastic exercises, the rest of personal hygiene was in a great measure associated, viz., care of the skin, washing, bathing, swimming and massages. Physical cleanliness included care of the hair and clothing as well as regulation of diet, rest, sleep, and sexual life. ("Notes on the History of Military Medicine," Lieut. Col. Garrison.) The physical development of the ancient Greek was of the highest order and well worth the time and energy devoted to it.

Lieut. Col. H. J. Koehler, of West Point, states that the statistics of the war prove irrefutably that the present methods of physical education have failed signally and that they will continue to fail unless some radical step is taken by some centralized authority that shall have the power to make this education mandatory in every school and educational institute throughout the land. It will fail even then, if the tendency to develop a few at the expense of many is persisted in.

In order to find out what each state was doing towards the conservation of the health of its school children, I wrote to each State Board of Health secretary for their latest reports and for bulletins of this subject, so that I might abstract them. I also hoped to get an index as to what amount of cooperation they would give along these lines. Being personally unknown to them and having only my title as a medical officer in the Army as an incentive for them to send the reports, I felt that most of the states sending the requested literature would do so because of their desire to help in the betterment of this health work, and also that they would not have an ill-will against the Army. Thirty-nine of the states responded to my request, although a few of them sent letters only, stating that, as their funds were low, they had no recent reports to send. This shows that they were interested enough to take the time and go to the expense of mailing these reports. I believe, therefore, if a definite plan could be formulated which would show some merit, that the different state boards of health would be glad to cooperate.

Quite a number of these reports had in them a paragraph or two in which they stated that, as the Draft Examining Board had found so many of the young men with physical defects, there was an urgent need for the state to prevent and correct these defects if possible.

More than ever are we impressed with the fact that better hygiene and sanitation is a patriotic duty.—*Bulletin California State Board of Health.*

It must be axiomatic that the health development of the human resources of the Nation is the one fundamental upon which our Nation's existence depends, and the security of the Nation is assured. This best can be accomplished by the wise training and health supervision of the growing child.—*10th Biennial Report of the Kansas State Board of Health.*

The health problems of the states differ according to their location and their chief industries. The South has more with which to contend than the North. The agricultural districts have not the advantages as the manufacturing districts have. Each state feels the effect of the lack of funds to carry on this important work. As a rule, the state boards plan and oversee the work and leave the carrying out of the details by the local city or county board of health. The personnel of the state boards has much to do with the legislature in passing health laws.

There should be the utmost understanding and cooperation between the State Board of Education and the Board of Health. Most of the states have a more or less efficient system for the physical examination of the pupils in the public schools of their cities and larger towns. Their methods are fairly standardized and are well known to all of us. For an example of the state examinations, we will take that given the school children of South Dakota, as it differs little from that usually given in most of the states. Their plan is for all the pupils in the different counties to be examined, if possible, at least once a year for physical defects, such as defective hearing, eyes, tonsils, nasal obstructions, decayed teeth, etc. Any teacher who has a particular case she wishes to be examined communicates with the school nurse as soon as possible. A record is used and kept in duplicate in the school which the child is attending and is transferred with the child in a change of classes or of schools. The nurse inspects all school children in regard to personal hygiene and gives lessons and demonstrations in this work.

Michigan is trying out a new plan by making a physical survey of the school children in that state. On last October 3, sixteen of its half-time school medical inspectors commenced an annual campaign of preventive medicine under the direction of the State Department of Health. Four of these sixteen physicians are serving as an immunizing squad, giving small-pox vaccination and immunizing against diphtheria. A schedule was followed from school to school. The school nurses were informed beforehand, and they had ready for this squad all the children whose parents had given permission for the vaccination and inoculation. The twelve other physicians conducted a physical examination of the pupils in the state. They were divided up into four teams of three each; a nurse accompanied each team. These teams also followed a schedule in traveling from place to place. It was intended that this work be finished by the last of November. Then these teams followed a similar schedule, this time examining all first-grade pupils and such casuals from the other grades as the school nurses desire to refer to them. Again on March 15, 1922, another circuit will be made to examine all of the fifth grade pupils. It is expected that in all about 50,000

pupils will be examined. If the defects found in these examinations are followed up and corrected, a great work will have been accomplished. This plan has the advantage of an initial impetus given it by the examiners, and, if taken advantage of by the nurses, more cases will be reached than if the work had been done by the local workers alone.

Nearly all cities have established some practical method for the physical examination of the school children, but the safeguarding of the health of the rural school children is as yet a great unsolved problem. Where physical surveys have been made in both rural and urban districts, they indicate that the country boys had as great if not greater percentage of disabilities as the city boys. The examination of the drafted men showed the rural rate to be 528 defectives per 1,000 to 609 of the urban men examined. The difference was due largely to the flat feet of the urban men. Surgeon Lumsden, of the United States Public Health Service, in a report of cooperative rural health work in which a physical examination was made of over 45,000 school children, found 27,631, or 60 per cent of them with more or less important physical defects. Their parents were notified and corrective measures were instituted. The lack of hospital and dispensary facilities, the lack of medical inspection and of the school nurses, together with the poorly paid teachers, insufficiently educated in sanitary subjects, the lack of physical training and the teaching of hygiene, lack of funds and cooperation with the parents are some of the most important reasons why the rural problems are not only the most difficult but also the most pressing.

Education and training along sanitary lines should make the country boy, if he would live up to his teachings, less defective than his city brother. His teeth are seldom given any attention, adenoids and enlarged tonsils unthought of. His diet is often poor and the foods poorly cooked. Nobody, until lately, has ever taken the trouble of instructing him or his parents concerning the dangers of these defects. Progress will undoubtedly be greater and quicker in the future in the rural districts when once started than in the foreign districts of the cities. In the past the farmers have been handicapped by their isolated condition, but with automobiles, better roads, telephones, institutes, daily papers, farm magazines and consolidation of their schools, there will be more community interests and the health problems will be among the first things to be taken up. The South seems to be taking more interest in their rural districts than the North.

A good efficient school nurse is the greatest factor in the conservation of the health of the school children. The nurse for the country schools is generally employed by the township or the county. Her work is not restricted, as a rule, to the schools alone.

South Dakota has the following rules to govern the actions of the

nurses in their state. She shall carry with her, in her nursing bag, full "first aid" supplies and render assistance in any emergency case, such supplies to be furnished by the county or city where she is employed. Each school shall be supplied with a first aid cabinet and the nurse shall instruct the pupils relative to the first aid methods. The nurse shall assist in finding the sources of illness and instruct members of the family in the methods of caring for the sick. She shall at all times be alert for tuberculosis and report the cases on investigating them. The nurse shall assist and, if desired, organize or direct cleaning-up campaigns and child welfare programs. She shall be on the outlook for insanitary conditions. For the county fair she shall plan and collect exhibits, which will help demonstrate health work and health conditions. She shall give demonstrations for Public Welfare Clubs, etc. She shall keep in touch with all clubs and other organizations of her county that bring the home and the teacher in closer relation. She shall give talks to mothers' meetings and wherever there is an opportunity for helpful work. She shall cooperate with health officers, physicians, hospitals, and other agencies in every possible way and endeavor to obtain their cooperation. She shall make calls to the homes of the children who have physical defects. The follow-up work in school children will make up much of the summer work of the nurse. In case where the parents fail to act, the nurse shall report the same to the superintendent of the County Board of Health. Her duties thus described look bigger than the duties of the medical officer as given in the Medical Manual. All of this, however, goes to show the vast amount of work which is to be done, and we will have to admit that the most of it is practical and essential if carried out in the proper manner.

The Public Athletic League of Maryland is making a systematic medical examination of all the pupils attending the public schools in the state. Whenever the examination reveals no defect, the child is given a "health token" medal to signify that he or she is in perfect physical condition. If a remedial defect is found, the child is given a green button, which indicates the physician's permission to participate in school athletics. Nurses are sent to the homes of the pupils to make arrangements with the parents to remedy any defect in the children.

In some of the Catholic schools, the nurses of their hospitals will give the physical examination. I would imagine that the defects found by them would be followed up better than in some of the public schools. In the private schools, especially in the military academies, the physical side of the school work is usually well taken care of. The same can hardly be said of the work given by private tutors, who, as a rule, do not spend much of their time on health education.

So far, we have covered the existing care taken of the health of the boys up to the age of sixteen or eighteen. If all the boys had been taken proper care of to these ages, there would be little to do for them until they reached twenty. Most of the boys who quit the schools at sixteen or eighteen go to work, either clerical or manual. Others continue their education, usually in college. If health habits are established in the schools, there should be some way of continuing them. Those that enter college are generally in good physical condition. Recently most of the colleges require the student to undergo a physical examination before being admitted. If, in the opinion of the examining physician, he is not in a condition to stand the strain of the college work, or if he is found tubercular, he is requested to stay out of the college until he is physically fit or cured.

In September, 1921, there was only one student out of one thousand who was refused admittance to the University of California on account of his physical defects. There were 109 found to have minor defects. Many of the college physicians urge their students to take the triple typhoid vaccine.

There are two more classes of boys who furnish us with defects—those who go to work and those who come to us from other countries. Between the ages of fourteen and eighteen there is a great demand upon the body, due to the rapid growth and the physiological readjustment. This, with the mental and physical strain of an occupation, is sometimes detrimental. The tendency of the recent labor laws is to keep the child out of industry until he is at least sixteen.

In Belgium the children who work are examined before starting to work, a month afterwards, and then once a year until they are eighteen years old. The examination is more frequent if the child is diseased. In our country we have eighteen states requiring an examination for every child before an employment certificate is issued. Ten states and the District of Columbia have permission laws, permitting the certificate-issuing officer to require the child, who does not appear to be physically fit, to be examined by a physician before he can secure the employment certificate. No state as yet has a law requiring an examination of every working child at regular intervals to determine whether the work at which he is engaged is injuring him or not. Twenty of the states have no provision at all for a physical examination, even when the child first goes to work.

A committee of the Children's Bureau has prepared a physical standard and a record form which was submitted in January, 1921. The minimum age is sixteen, the physical development must be normal for the age, an examination must be made before entering the work to

see whether he is fit for that specific job, and a reexamination once a year until the boy is eighteen, also in case of a change of occupation. There should be a uniform examination, and each state should have a centralized control of the method of the examination. The physician should study the conditions of the various occupations in order to make fair decisions.

The committee recognizes the impossibility of formulating a definite physical standard for all of the children in industries, which would be a complete and final authoritative without a great deal of scientific study of the effects of the different kinds of work upon the health and physique of the adolescent child. It is their desire to obtain the following data: (a) Rate of growth and development of children in the different industries compared with those not in industries; (b) comparative morbidity. (c) Comparative mortality; (d) comparative fatigue. (e) Effects of employment in specific occupations at different stages of physical development on the growth and health of normal and abnormal children. (f) Type of work desirable for mental defects and physical handicaps. (g) Health hazards in occupations which customarily employ children.

The present standard which the committee recommends is a refusal of a certificate for any one of twelve specified defects or diseases, which they have listed; that ten other specified defects bar them from receiving a certificate, pending the correction of these defects; that eight or nine other defects will allow a certificate to be given for three months, pending treatment. All the children with defects or poor family histories be excluded from certain occupations which tend to exaggerate that condition. One should not be too hasty to blame the occupation, for, as stated in the Reports of Defects of Drafted Men, one may not ascribe the defects to a certain occupation, for it is probable that those occupations have attracted men with these defects or who are susceptible to them.

The committee also prepared a form on which the records of each child can be kept together. It has space enough for three reexaminations. The larger manufacturing concerns realize the economic value of a physical examination before entering work, as there is a saving in the labor turnover.

Concerning the immigrants, if the present laws are followed, they should be given a thorough physical examination by the steamship companies before leaving the foreign port. All the defective ones should be refused passage. After arriving here they should be given another careful examination by our inspectors, all those with contagious diseases should be quarantined, and those with gross defects should be returned at the expense of the steamship companies. It would be very advanta-

geous to correct any minor defect which, although not dangerous to the boy or to others, is detrimental to his good health. These boys should not be allowed to land until these defects are corrected.

In the police courts, especially the juvenile, many defective boys can be picked up and the defects corrected before the boys are given their freedom.

There is another means of picking up the defectives which have slipped past the school authorities and labor examiners. It is the examination of those who desire to enter the military services of the United States. Over these the Army and the Navy have full control. Much can be done to improve the first physical examination given them. There is a definite standard given which should be followed, but from the number of S. C. D.'s given each year it looks as if some careless work were done, even in the Regular Army. In the National Guard and the Reserves, also among those entering the training camps, there is found a high percentage of unfits.

The examination of the men for the C. M. T. C. of the Fourth Area in 1921 showed 36 out of 1,083 men rejected. This is 3.6 per cent, while the draft of 1917 from the same area showed about 15 per cent defective. Lieut. Col. P. C. Sutton reports that the examination of the R. O. T. C. at the Plattsburg Barracks in 1921 gave 9 rejections out of 992 men examined, or about 0.9 per cent. This is a vast improvement over that of 1917, but these men were volunteers and expected to pass the examination, while the draft included all sorts and conditions of men who were compelled to be examined.

A study of the means of correcting these defects shows that they are as numerous as the methods of finding them. Unfortunately most of the cases are not corrected after being found. W. S. Leathers, M.D., the State Health Officer of Mississippi, makes this statement:

It is conceded that the medical examination of the school children is a function of the Health Department, and it has been shown by examination of many millions of children that unless proper follow-up methods are used to obtain corrections of physical defects, by the Health Department and other agencies that may be employed, that only about 10 per cent of corrections can be expected. When it is realized that the examination of the school children of the State involves many thousands of children, and that this work will have perhaps the most far-reaching effect of anything that can be done towards protecting the health of the child, it is obviously a great waste in time and money to the state unless it be followed up and provisions made for demonstrating its importance and obtaining a large percentage of corrections.

While the health official should use his ingenuity to direct and utilize the local agencies for effecting this result, under no circumstance should any of the corrective work be actually done by the representative

of the Health Department. This should be accomplished through the cooperation of the local physicians and, when necessary, utilizing the specialist.

We find that most of the defects found in the school children are corrected by the family physician. There are clinics in every city and large town, where treatment is given free if the patient is too poor to pay for it. In the rural districts there are not the same advantages. If, however, there is a good school nurse on the job who takes an interest in her work, she will find, somewhere close by, a physician or surgeon who will give some of his time and experience to correct the defects. In other cases she may find some philanthropic person or organization who will furnish the money to have the work done.

It is in this field that the Red Cross Bureau of Public Health Nursing does its great work. Its aim is to send out its nurses into the rural districts and smaller towns. The health activities in the cities are left to the local organizations. These nurses seem to be doing a great pioneer work and worthy of having the support of the people. The Red Cross divides the nation up into thirteen districts, each containing two to five states. Health centers are being established wherever most needed, and the nurses work out from these.

In the colleges, we find the health of the young men attended to by the college physician much as the medical officer watches over the health of the soldier.

In some of the larger industrial concerns, those boys who are at work in them, have the plant surgeon look after them. Prevention of accidents has been brought before the public more strongly than the prevention of diseases. Precautions of all kinds are being devised and used to reduce the number of injuries. The young men who are working in the smaller plants or stores can take the advantage of the free clinics if they care to do so.

As a rule, the defects or diseases arising in the latter part of the second decade consist mostly of venereal diseases or tuberculosis. For several days each state has been working to educate the citizens concerning the dangers of tuberculosis. They have erected in the counties and the state, sanatoria and clinics which deal solely with this disease. The American Red Cross has also specialized in this work and is doing an immense amount of good.

The venereal disease question has been kept in the background for a long time. During the war it was brought to light for the benefit of the soldiers. The impetus given it at that time has been strong enough to keep the work going. Practically all of the states are working in cooperation with the United States Public Health Service. An educa-



tional campaign is being carried on which promises big results. The National Government is rightly giving the states financial aid if they will help the United States Public Service to fight this plague. Laws of the different states now compel the physicians to report the venereal cases in the same manner as the other contagious diseases. They have established free clinics in the larger cities where diagnosis and treatment can be obtained. In 1919 there were only 237 of these clinics operating under the joint auspices of the State Board of Health and the Public Health Service. In 1920 these clinics increased to 427. The Public Health Service recognizes five standards of these clinics; A, B, C, D and E. All the states are striving to reach class A, as it is the highest standard. Those who report with a venereal disease at one of these clinics are carefully followed up and generally receive the full course of treatment. Recognizing that the prostitute is the chief source of these diseases, some of the states are sending the infected ones to a farm or some other institute for treatment. While there, they are taught some trade so that they may support themselves when cured and released.

One of the far-sighted pioneers for the conservation of health is the Metropolitan Life Insurance Company. Their plan is to increase the length of the life of their policy-holders, for the simple reason that it is good business to do so. They send out nurses into the homes of its sick. These nurses teach the family how to care for the sick by practical demonstrations, just as the school nurse does. Many of the boys were reached in this way for, during the period between 1911 and 1916, out of every hundred males insured by them, there were 13.62 per cent between the ages of ten and fourteen and 12.30 per cent between the ages of fifteen and twenty, making a total of 25.92 per cent within the second decade. Instructive health pamphlets were sent out by the thousands and surely had some effect on those who read them. The other insurance companies are doing similar work.

Recently, with headquarters in New York City, a company called the Life Extension Institute was organized. Its purpose is to awaken the people to the dangers which destroy health, and it advises them to seek medical attention early. Keep-well leaflets are sent out by them, and the company will answer any questions pertaining to the health of their clients. They intend to employ the best of physicians and surgeons throughout the country and refer those desiring examination to them.

It seems to be a law of nature that while some of the forces are building up the body, others tend to tear it down. We also find certain "isms" which take the credit for what Nature does in curing diseases, especially the acute infectious ones. They ignore the effect of the bacterial poisons on the vital organs, which may not at that time show

much injury but may give trouble in the future as a chronic disease. However, only a few of these cases will break down in the second decade.

As stated before, the southern states have more to overcome than the northern states. Their largest problems are the hookworm and malaria. The interest aroused lately to better their conditions can be shown by the work that Alabama is doing. There are now 63 malarial control projects under way as compared to one in 1917 and 12 in 1920. In 1922 a program is contemplated in which the Public Health Service and the International Health Board will cooperate with the state. In addition to this, many of the various communities will give financial aid.

If the family physician would contract to keep the health of the family in good condition for a definite sum per year, there would be less sickness, for the members of the family would go to see the physician when they were feeling unwell and not wait until they were very sick. Also the physician would tend to advise them more about the preventive measures and would not hesitate to correct some defect he saw in one of the family and not wait until asked to do so.

In our review of the methods employed by the better organizations for the conservation of health, we find a few common factors. A thorough examination and treatment by a competent physician. The use of a specially trained nurse to follow up the cases is another. Physical exercises which tend to properly develop the body and the education of the public along health topics are also necessary. Centralization of the work under the state health authorities is very important.

The ideal way for the American people to conserve the health of the males between the ages of ten and twenty would be compulsory registration of all of them between these ages and of those who reach this age in the future, together with the boys who come to us from other countries. After registration, a thorough physical examination should be made of each one by a competent physician, preferably one who has seen service in the Army or Navy and who knows, from experience, the physical strain which the soldier must undergo. To facilitate this work the nation should be divided up into districts as it was during the emergency. A standard examination should be formulated by a committee well versed along this line of work. The standard should strive to attain the physical qualities of the ideal soldier, which have been given in the first paragraph of this essay. A record should be kept of each boy examined and the results of the examination carefully noted. The boys should be classified according to whether they have any defects or not. The defective ones should be classified again as to whether these defects can be cured or improved or are incurable.

All of those who have defects which can be cured or improved should have immediate benefit of medical attention. This treatment should be given by the family physician or a specialist, if the family is able to pay for the corrections. Otherwise it should be done in the free clinics or hospitals of the city, county, state, or government.

A reexamination should be made when the boy reaches fifteen years of age and again at twenty, in order to note any new defects and to determine whether the old ones have been corrected or not. There should be provisions for the making of a special examination at any time in case of necessity.

At the time of the first examination the boys should have a Wassermann made, also a Schich's test, a test for the type of agglutination of the blood. The stools should be examined for parasites. Inoculation should be given against typhoid and paratyphoid, a small-pox vaccination should be made and, if desired, an inoculation against pneumonia and influenza. At the reexaminations all the tests and inoculations given at the first one should be made again with the exception of the Schich's and the agglutination. Standardized exercises should be given in all the schools for the proper development of the body. These exercises should vary with the different grades and should be selected by some specialists in gymnastics. Overseeing all of this work should be an authority located in Washington and under the Secretary of War. All the records should be kept in his office, tabulated, and studied for the betterment of health work. Universal training towards the end of this decade should be required of all those who are physically fit.

I believe that this plan would obtain the best results at the least expenditure of both time and money. It would save time, as it would centralize the work in Washington, where it belongs as it is a national problem. It would save money because it would do away with a lot of duplicated work done by the various organizations. It would reach every boy in the nation. It is entirely practical and in the future it might be carried out. At the present time, however, on account of the reaction resulting from the World's War, the ideal way would appear too military, and I hardly think that the public would support it.

An alternate plan would be to let some of the existing national health organizations take up the work and the military forces support them.

The United States Public Health Service is doing much good work among the venereals and in the surveys of the physical defects of the children by their cooperative work with the different states. They might be able to obtain financial support from the Government to carry out this conservation work. The financial difficulties seem to be the greatest at present.

There is much being done by the other organizations, and much will be done by them in the future. It will, however, take longer to reach every boy by these means, but, as it is, there is a notable advancement being made toward the desired end. There is a tendency to consolidate all the different health agencies so that the work can be interrelated, thereby enlarging the opportunities for cooperation in the public services. The most important consolidation is that of the National Health Council, which is composed of representatives from nine of the leading national voluntary health agencies; as follows:

1. American Public Health Association.
2. American Red Cross.
3. American Social Hygiene Association.
4. Conference of State and Provisional Health Authorities of North America.
5. Council of Health and Public Instruction of the American Medical Association.
6. National Child Health Council, composed of The American Child Hygiene Association, The Child Health Organizations of America, The National Child Labor Committee.
7. National Committee for Mental Hygiene.
8. National Organization of Public Health Nursing.
9. The National Tubercular Association.

The United States Public Health Service is a conference member of the National Health Council. There are a multitude of other organizations which are doing health work in the same localities, therefore some of the sick are over-attended, while others are not receiving attention.

The consensus of opinion, among those working for a better physical development of the children, is that health habits are more easily formed in childhood than later in life. As the largest masses of children are already collected in the schools they can be handled at these schools with the least expenditure of time and convenience. The schools also have back of them a powerful tradition for the advancement of new ideas, and the most should be made of this fact. The biggest disadvantage of this means is that not all of the children attend the schools and colleges. Nevertheless, the schools should be made the basis for this kind of work. As each state controls the schools within its boundaries, one would look to the state to control the method of the conservation of the health of its pupils. The health of each state is centered in the State Board of Health or its equivalent. All the work done in the state concerning the health of its citizens should be done through it.

As the U. S. Public Health Service at present has working plans for

the health surveys of children, these should be remodeled so that every child in the state could be examined when entering school, again at ten, fifteen, and twenty. The work should be done in conjunction with the State Board of Health, the State Board of Education, and the Labor Board. The Public Health Service should be at the head of the plan and coordinate all the work. The State Board of Health should have the power given it by the State Legislature to do this examination of the pupils. By cooperating with the Board of Education they could obtain the names of all the school children, and by cooperating with the Labor Board they could obtain all the names of the boys at work.

Those found defective at these examinations could be treated as suggested in the plans of treatment in the ideal method. This plan would necessitate the training of selected physicians to do the examining and of school and county nurses to do the follow-up work. In this plan the county would be the unit, the state the intermediate, and the Public Health Service the centralizing authority. A national law should be passed compelling the states to support some plans of this kind. The Public Health Service would want to make some improvements as were suggested in the Public Health Reports of August, 1921.

1. Reorganization of the teaching of hygiene in the regular courses and assigning it to a place in the curriculum equal in importance to that of other major subjects.

2. Organize classes in physical training.

3. Supplement class room instruction by the individual and group instruction by physical training instructors, school nurses and school physicians.

4. Encourage addresses by specialists from time to time.

5. Utilize domestic science classes for teaching food values and food preparations.

6. Improve the sanitary surroundings of the school buildings and playgrounds.

7. Improve the medical inspections.

8. Employ only qualified nurses.

9. Provide hot lunches.

10. Organize classes in first aid, nutritional classes, open air schools, and use them for practical instruction.

11. Teach the prevention of accidents.

12. Distribution of health leaflets dealing with the particular disease or defect with the notification to the parent of the children sent home.

13. Encouragement of the preparation of exhibits, posters, and compositions relating to health conservation.

14. Redistricting the city and assigning nurses in sufficient numbers

to each district to furnish the combined school and public health nursing. There should be one nurse to each thousand and one school physician to each three thousand school children.

Until the time comes when there is some one organization having complete control of the health of the children of the nation, the military forces could help very much in advancing the health of the young men of military age, and also give support to the work among the school children.

I believe that great good can be accomplished by interesting all the young men possible in the National Guard, the Reserves, and the Training Camps. Those who join some branch of our military organizations should be given a thorough examination by a medical officer with the intent to find any physical defect which may exist. These defects should be corrected as soon as possible. These corrections could be made by civilian physicians and surgeons in the civil clinics and hospitals or in the army hospitals, and later, perhaps, in the government hospitals now being used by the ex-service men. With only thirty days or less in the active service out of the year, it is hardly expected that the men should spend half of their time being treated in the hospitals free of charge and also receiving pay from the Government. A better plan would be to have them report before the camps open or to remain after the camps are broken up. They should have the understanding that they receive the treatment free, but they would not receive pay for the time they are being treated. Here, again, we would be confronted with the financing of the plan, as this treatment will take money and the army should not be charged up with it.

The medical officers of the National Guard should have all the defects of their men corrected during the time between camps. They could easily keep a list of men who have defects as shown when enlisted or during the sick calls at camps. They could give the various vaccines and inoculations during the interval also.

In order to reach the other youths who are not old enough to join some military organization, and those who do not care to join, a medical liaison officer should be created to aid the Public Health Service and the other agencies in their work. In general his work would be to establish connection between the medical departments of our military forces and the various organizations which are interested in the conservation of the health of the children and to cooperate with them in all the work that tends to make the boys more fit for military duty.

As our nation is divided up into nine corps areas and centralized in Washington, so could this work be divided up between nine medical officers, who would be well qualified for this work, each having one or

two clerks as assistants. One of these officers should be in each Corps Area Surgeon's office, his district corresponding to the Corps Area. A tenth officer, the chief of the work, should be in the Surgeon General's office and be responsible to him for the work.

In detail, the liaison officer should study the different health organizations now in existence and doing this sort of work, both in the United States and in foreign countries (see the appended list for some of the organizations which could be used for the development of this work). He should formulate a plan to cooperate with these agencies to avoid the overlapping of the efforts of each, thereby saving energy and preventing confusion. An attempt should be made to centralize all the work done in the state in the State Board of Health and that done in the nation in the Public Health Service. Standardized plans for this should come from the chief liaison office. Help should be given the other agencies to fashion the state and national health laws with the aid of the American Legion.

The liaison officer should assist the schools and colleges to formulate the methods of examining their students in order to standardize it. He could direct the proper propaganda through the proper channels at the proper time. He could help institute a National Health Week, in which all the medical reserve officers should be called into active service to examine all the males between the ages of ten and twenty who desire to find out whether they are physically fit to serve their country. At this time small-pox vaccination could be given and the triple typhoid inoculation started. He could make arrangements with the college physicians to give these inoculations between the training camps to the boys who attend these camps and thus save time and trouble when the camps open up.

The medical liaison officer could give lectures on military health topics to the college students and to the pupils of the schools, also to other groups of young men, if there would be a demand for them. He could arrange for the other medical officers, both active and reserve, to give similar lectures. He could see to it that a course of hygiene was introduced into the schools.

He could follow up all the cases of defectives found in the men at their preliminary examination on entering a military organization and endeavor to have them corrected between camps. It appears that the mechanical defects, our largest group of defects found in the drafted men, are not being given as much attention as the other classes. Our officer could see to it that these were brought to the front more and given the proper attention both in the examinations and in the treatments. He should introduce the physical examination into the Boy

Scouts of America as at the present time they have none, although their work tends to overcome many defects.

The medical liaison officer should keep in touch with any change in the methods of the physical examinations of the school children and young men. He should study the methods of the other nations which better the physical conditions of their citizens and introduce them into our system in case they are better than ours. He should encourage all forms of athletics in the school and colleges, endeavoring to see that the mass and group exercises are not neglected. He should establish evening playgrounds and introduce games that tend to develop the body. He should encourage all gymnastic work done in the cities. He should see to it that the rural districts have the same advantages as the urban in matters pertaining to the finding and correcting of defects and the prevention of them, and that athletics are not neglected in the rural schools.

He should use the newspapers, magazines, movies, and other educational means of keeping the medical officers in the Regular Army, the National Guard, and those in the Reserve, in touch with the development of his work. He could help in the study of new serums by overseeing the work done among the soldiers of his area. He could keep in touch with all the epidemics, obtaining aid from the Army for guard duty or sanitary work, if there was a need for them to help control the epidemic.

By his helping, aiding and assisting the present organizations, I believe that he can greatly improve the physical condition of the youths of our nation, who are very much in the need of help.

The Navy could have an officer doing similar work in its branch of service.

#### APPENDIX

The United States Public Health Service.  
The National Health Council, with its nine members.  
The Boy Scouts of America (indirectly, the Girl Scouts).  
The Bureau of Public Health Nursing of the Red Cross.  
The State Board of Health and the State Board of Education.  
The American Legion.  
The Y. N. C. A., the K. of C., and the Y. M. H. A.  
The Salvation Army.  
The National and State Medical Societies.  
The Medical School and Clinics.  
The State and City Free Clinics.  
The International Congress of Physical Education.  
The Press Association.  
The Fraternal Orders and College Fraternities.  
The Labor Unions.



The Boys' Club Federation.  
The Parent-Teacher Association.  
The Teachers' Institute.  
The Farmers' Institute and Grange.  
The Police Courts and other court authorities.  
The Life Insurance Companies  
State Federation of Women Clubs.  
The Chambers of Commerce.  
The Associated Charities.  
The Gymnastic Societies.  
The Modern Health Crusaders.  
The Public Athletic Legion of Maryland.  
The State, County, and Industrial Fairs.



# THE CHILDREN'S CLINIC AT FORT SAM HOUSTON, TEXAS

BY MAJOR ERNEST C. McCULLOCH

*Attending Surgeon, Fort Sam Houston, Texas*

IN THE early part of the present year it was suggested by some of the members of the Ladies' Guild of Fort Sam Houston that it would be desirable to inaugurate a clinical conference for parents of babies and young children in the vicinity of Fort Sam Houston. Maj. P. S. Tucker, M.C., on duty at the Station Hospital, Fort Sam Houston, had been for some time giving advice about infant feeding to mothers of infants, but about this time, on account of the increasing demands upon his time by the hospital work proper, he felt obliged to give up this clinic of his. Accordingly it was thought advisable to continue this work at the office of the Attending Surgeon, Fort Sam Houston, to broaden the scope somewhat and encourage and invite attendance. A large room was available and no additional equipment was necessary except a baby scales which was purchased by the local Chapter of the Red Cross. Three of the ladies who were members of the Ladies' Guild were selected to help in entering the names and weights of the babies, in weighing them, and assisting the mothers generally. The present writer was assisted in the professional work by Maj. William H. Lloyd, M.C., Surgeon of Infantry Post, Fort Sam Houston, and Captain M. F. Du Frenne, M.C., assistant in the Attending Surgeon's Office, and without their very efficient help not nearly so much could have been accomplished.

A general notice was published to the personnel of Fort Sam Houston and the outlying stations, Camp Travis, Kelly Field, and Brooks Field, setting forth the general purpose of the clinic. The first clinic meeting was on February 9, 1922. To the present date (June 12, 1922) a total of 150 children and babies have been brought to the clinic. The clinics have been held on Friday afternoons and the average attendance each week was 25 cases. Some of the parents have manifested notable zeal and enthusiasm in bringing the children frequently and making an honest endeavor to carry out instructions as given. Others have fallen by the wayside through lack of real interest or failing to understand the importance of the directions as to diet, etc. On the whole, however, the general result has been most encouraging. There has appeared to be, aside from the concrete results in improving the welfare of individuals, a stimulation of interest in the general aspects of child hygiene.

It was rather surprising to observe in our clientele here, which has

had for a long time the benefits of free medical attention and advice, how many children were suffering from remedial defects. Not a few cases of adenoids and tonsils have been unearthed, some of these the children of very intelligent parents. The teeth and eyes in general have been very good, probably owing to the system of school inspection in San Antonio. Instruction in dietary matters has been the main part of our work. We secured some very good pamphlets for different ages from the University of Texas and have given these out liberally with instructions to follow these directions as to diet. A limited number of copies of Mrs. West's "Care of the Infant" were secured and distributed where they would do the most good. No attempt has been made to give general talks on infant or child hygiene; as to the class of personnel we have to do with here the only questions they are interested in is "why Sarah don't eat more," or "why John don't get along in school," or what is causing the baby's "stomach rash" or why he cries at night. Along with individual instruction adapted to the particular case, however, we have attempted to give as much general instruction in child hygiene as appeared to be useful.

The personnel of our office soon observed that calls of an emergency nature for a doctor to come to see a baby that had colic, or convulsions, have been becoming fewer and have been confined almost exclusively to the families who had *not* been to the clinic. The net result has been a reduction of our work. We feel that our infant mortality and morbidity is small.

The benefit of this conference was so noticeable to all concerned that an assembly was called of all the camp surgeons in the vicinity of Fort Sam Houston and the nature of the work explained to them. Clinical conferences of a somewhat similar character have now been started at Camp Travis, Kelly Field, and Brooks Field. I believe that some such conference should be held at every camp or post in which there are enough infants and children to justify it. The day is past in the Army when the medical officers could afford to neglect women and children. If the parent in the Army feels that he cannot get skillful medical attention from his own surgeon, he will engage civilian physicians but the morale of the service and the reputation of our Medical Corps suffers thereby. Time and again we have had the remark made to us, "Why, I didn't know there were any doctors in the Army that knew anything about babies!" We all feel, as one of the assistants a short time ago expressed it, that the establishment of this clinic has been worth all our efforts and the results eminently satisfactory.

# *The Military Surgeon*

*Published monthly and constituting two volumes annually.  
Volumes commence with the January and July numbers.*

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Entered as second-class matter January 22, 1916, in the Postoffice at Washington, D. C., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917; authorized July 2, 1918.

Subscriptions \$1.00 a year for the United States. Elsewhere throughout the world \$4.50. Single copies 50 cents. Subscriptions payable in advance. Checks should be made payable to The Association of Military Surgeons, U. S., and not to any officer personally.

*The addresses of members and subscribers are not changed except upon request. In every case the old as well as the new address should be given. Requests for change of address must reach the Secretary before the twentieth of the month to be effective for the following issue.*

Original articles, items of news and matter of interest to the Services are welcomed. Requests for reprints should be made at the time of forwarding articles.

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## EDITORIAL

### THE ABUSE OF NARCOTICS

There has been a recent uneasy realization that there is a growing tendency toward the use of the so-called habit-forming drugs, which may be grouped as opium, cocaine and heroin. Attention has been called to this in the press and within the past month this practice has been featured in the Washington (D. C.) papers. It is conceded, of course, that this abuse is not a new thing; long before DeQuincey wrote his classic on the subject there were those who sought surcease of sorrow at this Nepenthe, but it has been the submerged tenth which bore the odium. Even at the present time it is undoubtedly this same tenth which is responsible for the preponderance of the habit, but it seems evident that this tenth is growing, and to proportions which may be a menace to national health and national morals. It is a question of morals, too, as well as one of bodily well-being, for it is very clearly determined that indulgence in this vice certainly predisposes to crime; either crime against property or crime against the person. When the Harrison Narcotic Act was made law it was hoped that this regulation might be a check to this vicious indulgence, but it seems that it still flourishes irrespective of legal enactment.

In the creation of the Federal Narcotic Control Board, Congress has taken another measure to bring within the control of the government, and more stringently than before, a traffic which is now a serious menace to the man power of the nation and which may, unless checked, become even more serious.

It is a difficult matter to adduce any accurate statistics in regard to the consumption of habit-forming drugs in the United States for obvious

reasons. In 1919 a special committee of investigation was appointed by the Secretary of the Treasury and its findings are the most accurate figures which we have, although necessarily incomplete. In this report there is a table comparing the per capita consumption of opium in the United States with that of Austria, Italy, Germany, France, Portugal and Holland. This comparison brings out the uncomfortable fact that the per capita consumption in the United States is from thirteen to twenty-two times as great as in the countries named. The per capita consumption in the United States is recorded as 36 grains. Allowing one grain as the average dose of opium it is evident that there are 36 doses each year for every man, woman and child in the country. This is, of course, an absurdity since the majority of people year after year never take a dose of opium and demonstrates that this huge per capita consumption must be laid to use by addicts.

In India, one of the countries where opium is produced and the trade licensed and regulated by the government, the annual consumption is 26 grains per capita or 10 grains less than in our own country which has not the age-old narcotic habit of this eastern empire.

These statistics cover a period of forty years and during that time the population of the United States increased two and a half times,—while the annual import of opium for consumption increased about five times. This is hardly encouraging for a country as young and vigorous as ours. It must not be hastily assumed that this increase in drug addiction is chargeable to national prohibition, for the forty years covered by the report comprise the period from 1860 to 1900. It is still open to demonstration as to whether difficult acquisition of alcohol due to our recent prohibition legislation will be found responsible for an increase in the consumption of the habit-forming drugs.

There are arguments pro and contra and these are probably tinged by the views held by wets and dries. It will probably be difficult to determine exactly the relation of any increase in the consumption of narcotics to a deprivation of alcoholic beverages in the light of the statistics quoted which cover a pre-prohibition period.

The remedy for this evil is not an easy one to find. Its effects are less generally manifest than those of liquor and the traffic is one which can be carried on with less publicity owing to the comparatively small bulk of the commodity dealt in. Much can be accomplished by legislation, particularly as to what deals with imports, and this is being done. But after all, no evil practice can be abated by the enactment of law. Law will hold in check and reduce to a minimum, but it is not a "*therapia sterilans magna*." Since the days of the Commandments we have been forbidden murder, adultery and the other crimes against person and

property and we still maintain courts and judges and police to enforce these prohibitions. The just man needs no law and the unjust will, in a certain number of instances, evade it.

Our greater safety, after sane and careful legislation, lies in education of the youth; in seeing that there is a thorough understanding in the minds of our young of the fruit of this evil. Education by precept and warning in this respect is not all that is needed, for we are learning that there is a close correlation between the education of the mind and the education of the body. It is wise to instil proper principles in the mind of the young, but it is still wiser to supplement this by something which will practically demonstrate the value of clean habits. Habits which tend to break down mental and bodily morale are more clearly appreciated, more readily shunned, when there is a concrete demonstration of their harmful influence. Teach the young, by lecture and collected data, that this practice is harmful, but give them a proper pride in the welfare of the physical ego and we shall go farther than if we confine ourselves merely to statistics.

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Owing to the press of work incident to his coming departure for foreign service, Colonel Garrison has found it impossible to complete the last installment of his series of articles on the History of Military Medicine in time for this issue, and it will, therefore, appear in the August number.



## COMMENT AND CRITICISM

### MARCH OF THE THIRD INFANTRY FROM CAMP PERRY, OHIO, TO FORT SNELLING, MINNESOTA

1. The Third Infantry, after arriving at Camp Perry, Ohio, from Camp Sherman, Ohio, a distance of about 200 miles, was employed as a part of the detail to the National Matches, 1921. The duties were those about a large rifle range during rifle matches, some "pulled targets," while others performed the usual guard, fatigue, and police about the camp. The arrival was on August 22, 1921, after eleven days of marching. Both morale and physical condition were excellent.

2. The regiment comprised about twenty officers and 200 enlisted men. There were five companies, viz., "E," "H," "How," "HdQRS," and Service. All foot troops were in Company "E." There were 37 government horses and one private mount, 113 mules, 22 escort wagons, two water carts, one rolling kitchen, one horse-drawn ambulance and one 3-ton motor truck in the train.

3. Among the enlisted men were 85 noncommissioned officers and 110 privates 1st class and privates. The average age was 27.3, the youngest was 18, the oldest was 52. The average years of service was 5.3, the longest was 27, the shortest was 1. They were soldiers who almost without exception refused to accept a discharge on the reduction of the Army; men who thought they should complete their enlistment, a good type of American soldier.

4. The thought of making a 950 mile march to their new station brought forth many humorous remarks, such as "hobnail express." Some hesitated to believe the march would be made, while many were willing to ride rather than march. It was thought that at the eleventh hour orders would be changed and the "Old Guard" proceed by train. There was no dissatisfaction when it was known the march was to be a fact.

5. At Camp Perry the troops were under pyramidal tents and on cots. Sanitary conditions were excellent except for the water supply. Large numbers of cases of diarrhea had occurred in the camp during the Ohio National Guard Encampment, which was just previous to the arrival of the regular troops. The same condition prevailed in respect to diarrhea in our troops, but entirely disappeared in a few days after a chlorinating plant was installed and operated at the pumping station. Hypochlorite of lime was used in increasing amounts until chlorine could be detected at all taps by the usual tests. Water from the taps showed 2-1,000,000 free chlorine, and effort was made to maintain the same throughout the encampment. No new cases were reported after the water showed chlorine at the taps.

6. The messes were good, grounds well drained, policing excellent, garbage disposed of by incineration, bathing in Lake Erie, and on the whole the stay at Camp Perry was all that could be desired under canvas.

7. Three days were spent in preparation for the departure; requisitions and inspections were frequent. The regiment turned in pyramidal tents and went under shelter tents September 24, 1921. The weather was warm and clear.

8. Orders were issued to have equipment of the men as follows:

$\frac{1}{2}$ tent shelter.	5 pairs strings, shoe.
1 pole shelter tent.	1 raincoat.
4 blankets, O. D.	1 overcoat.
1 Blouse, O. D. Wool.	1 hat, service.
2 pants, O. D. wool.	1 cord, hat.
2 shirts, O. D. wool	1 belt, waist.
3 undershirts, wool.	1 pack and carrier.
3 drawers, wool.	1 meat can, knife, fork and spoon.
3 pairs socks, light wool.	1 bottle, water, and cup.
3 pairs socks, heavy wool.	1 bag, barrack.
3 pairs shoes, garrison special or hobnail.	1 gloves, woolen, pr.
	1 sack, bed.

For drivers the following articles were added:

1 coat, blanket lined.	1 cap, winter.
1 pair artics.	1 pair gloves, leather.

9. The regiment broke camp before daylight the morning of September 26, 1921, and started on the second part of their long hike to Fort Snelling, Minnesota. The first day's march was 16 miles, and in the next few days several marches below the daily average were made to enable the men to become hardened and the harness adjusted to the horses and mules. Arrival at Fort Sheridan, Ill., was on October 15, 1921. The distance covered was 330 miles. After a five-day rest, the regiment started to Fort Snelling and arrived there on November 17, 1921. The distance was 430 miles. From Camp Perry, Ohio, to Fort Snelling, Minn., was 758 miles. The number of marching days was 42, the number of rest days was 7, the average miles marched per day was 17.9, the longest day's march was 22 miles, and the shortest day's march was 14 miles.

10. The weather conditions were very good for ten days out of Camp Perry, after which it rained quite frequently. Raincoats were worn when needed. Officers below the field rank and men slept on the ground under shelter tents. Bed sacks and straw were used. Each man had 4 blankets. This enabled the men to sleep comfortably, two in each tent. During rainy weather the tents leaked considerably, frequently blew down, and clothing and men became wet.



11. The camp sites were usually fields rented from farmers, although a few sites were on fair grounds and public parks. The sites were selected as to favorable watering places for the animals, drainage, dryness, distance from previous camp, sanitation, and convenience to towns en route. Several sites did not permit digging holes for fires, latrines and garbage, but public latrines were available at these places. Generally the fields were good from a sanitary standpoint.

12. All water was obtained from drilled wells, usually at the nearest farmhouse and nearly always of good quality. All water was chlorinated with the issue 1-gram tubes of hypochlorite of lime into each water cart, from four to six being used, depending on the survey of the water and wells. The chlorination of the water was in charge of a sergeant from a line company. The water carts were kept in a very good condition of repair and cleanliness. There were two, and due to the distance of haul both were at times kept busy. During very cold weather the water in the carts froze and the taps had to be thawed out by placing the end of the cart near the camp fire over night. It became necessary to bail the water out of the top of the tanks when water was frozen. It is of interest to note that no intestinal disease developed during the march. All men of the command were cautioned to use only water from the carts. All men in the command had completed typhoid inoculations before beginning the march.

13. During the cold weather no respiratory diseases developed. Ventilation by open door and open hood of pyramidal tents was a standing order, this being checked each night by the officer of the day. "Too much fresh air" was the cry from the men, but the order was rigidly enforced. The daily allowance of straw, which was procured from the farmers, was about 5 pounds to the man per day, and as it accumulated from day to day a comfortable bed was had. Straw was burned in camp fires when it became old or wet. The sacks and straw were carried either in the wagons or ahead of the column of troops in the motor truck, depending on the amount of space not utilized that day.

14. Fires in the company streets were used during cold weather. The number of fires varied with the layout of the camp but averaged six. The wood was procured from farmers, the daily allowance being from one to two cords. On rest days, which were all Sundays, the fire consumed up to 3½ cords of wood. Around these fires the men gathered to get warm, dry clothes, socks and shoes. Many evenings the song leader and the men sang until taps.

15. One rolling kitchen and one field range were the only cooking equipment. The noon meal was eaten from mess-kits along the road. Mess-kits were kept clean and washed in two boilings of water after

each meal. The rolling kitchen was kept clean and was frequently scrubbed by the prisoners with soap and water, utensils the same.

16. The food was good and as well prepared as was possible under conditions in the field. On Sundays an extra good noonday feed was given the men because it was possible to cook more during the day of rest. The ration allowance was \$0.3119, and \$300 additional was spent from the regimental fund. The food consisted of such articles as bread, beans, peas, potatoes, sweet potatoes, ham, bacon, beef, stew, soup, prunes, dried apples, rice, raisins, chicken, veal and eggs. The most of the food was obtained in the open market.

17. A canteen owned and operated by a civilian and his wife accompanied the regiment. This sold to the men, at reasonable prices, such articles of food and supplies as would be in demand. The surgeon inspected the canteen regularly and made corrections as needed. The canteen automobile managed to catch the column at the noon halt and sold doughnuts, pies and cigarettes. In camp, hot hamburger sandwiches, coffee and lemonade from the canteen were much appreciated by the men.

18. Pyramidal tents were drawn at Fort Sheridan, with additional clothing for the men. With pyramidal tents the men were able to sleep more comfortably and keep their equipment dry. As no Sibley stoves were carried, 12 quart tin buckets were procured and the men allowed to carry into their tent one bucket of hot charcoal from the wood fires. This would soon make the tents very comfortable and afford opportunity for drying shoes. The command was warned by the surgeon concerning the ill effects of gas, and no illness from the same was noticed. The buckets of fire were removed from the tents at 9.00 p. m.

19. The pyramidal tents, 26 in number, were carried ahead each day during cold weather, in a motor truck and pitched by a detail of about ten men. Camp fires were also lighted, which added greatly to the comfort of the men.

20. Bathing was accomplished by accepting the invitation of civic organizations such as the Y. M. C. A., K. C., Red Cross and American Legion, public schools, etc., along the route. The frequency of these baths was more than ample during the entire trip.

21. Laundry was done by each soldier on Sundays, there being a detail to heat water in large G. I. cans. Socks were washed more frequently and dried by the camp fires. Each man shaved daily during the march; one barber worked each day after arrival in camp until dark.

22. Sunday was used as a day of rest, of which there were seven. Clothes were washed, equipment scrubbed, harness oiled, shoes cleaned;

inspections being rigid. In the afternoons the men were at liberty, if inspection had been satisfactory.

23. There were no restrictions on the men during the "hike" provided the "hike" was made and the equipment and fatigue satisfactory. Some few instances were punished, but very seldom was it necessary. The average number in the guard house was between three and four.

24. The prisoners dug latrines and garbage pits, also filled the same while camp was being broken in the morning. Over latrines small tents, two in number, were pitched, these being cared for by the prisoners.

25. The general police of the camps was excellent. When the troops left the field shortly after daylight the grounds were well policed.

26. Physical inspection was held bi-monthly and no new cases of venereal disease were detected. The number of prophylactic treatments given was fifteen. The underclothing and socks were found clean at each inspection.

27. Sick call was held immediately after arrival in camp each day and the number reporting sick was very small, although the first ten days of marching brought many to the dispensary for adhesive tape and bandages. Numerous blistered heels and calloused feet were in evidence. Later when the men's feet became hardened to the road and adjustment was made in shoes and socks, nearly all foot trouble disappeared. With cold weather, slush and snow, many more sore feet again appeared. The greatest problem was to get shoes dried without undue shrinkage. Saddle soap was used freely with very satisfactory results.

28. During the whole trip three men were sent back from the column, sick. The diagnosis in these cases were as follows: Ulcer, duodenal; abscess rectum, mild; fracture, metatarsal left great toe, accidental.

29. The case admitted to quarters were few, and of these the majority were blistered feet. There was no disposition among the foot troops to ride the ambulance. The number riding never exceeding three on any day of the march.

30. There were no contagious or communicable diseases during the march. Inquiry was made of public health officers in towns en route as to the prevalence of contagious diseases.

31. The medical equipment carried was: 1 ambulance, horse drawn; 4 mules; 2 litters, with slings; 1 tent pyramidal; 1 chest medical and surgical; 1 unit prophylactic; 1 desk, field; 1 box dressings and drugs; 2 lanterns, commercial; 2 Thomas splints, upper and lower; 1 guidon; 1 belt, Medical Officers web.

32. The enlisted personnel of the Medical Department was one

corporal and three privates. They proved quite equal to their duties during the march. However, it should be mentioned that the ambulance and mules were cared for by the Service Company.

33. War Department Circular 229 was very enthusiastically carried out. The relations with the civilian population were very cordial. The dances, banquets and entertainments furnished by civic bodies, Y. M. C. A.'s, Red Cross and American Legion were greatly appreciated by the officers and men. The civilians showed much interest in the regiment and helped the morale of the troops.

34. Considering the weather conditions, the distance of the march, the season of the year, and the low morbidity rate throughout the trip, it is believed that this march of the 3d Infantry has established a record of which it may well be proud.

D. J. HAYES,  
*Major, M. C., U. S. Army.*

#### **SMITHSONIAN INSTITUTION TO HOUSE PUBLIC HEALTH EXHIBIT**

The National Committee on Exhibits Showing Advances in Sanitary Science has recently been formed in Washington, D. C., for the purpose of collecting and preparing material for a great popular public health exhibit in the capital. The members of the committee include: Surgeon General H. S. Cumming, U. S. Public Health Service, chairman; Dr. D. B. Armstrong, National Health Council; Miss Mabel T. Boardman, American Red Cross; Surgeon General M. W. Ireland, U. S. Army Medical Corps; Dr. Victor C. Vaughan, National Research Council; Dr. C. D. Walcott, Smithsonian Institution; James A. Tobey, National Health Council, secretary.

Space for the proposed exhibit has been placed at the disposal of the committee by the Smithsonian Institution, which is visited by more than half a million persons annually. Plans are under way to install exhibit material secured from official and voluntary health agencies. The secretary's office is in the national headquarters of the American Red Cross at Washington, D. C.

#### **REPRINTS OF OLD EDITIONS**

The United States Infantry Association of Washington, D. C., has made a reprint from new type of "American Campaigns" by Col. Matthew Forney Steele, U. S. Army. This is one of the military classics of the United States, but the editions originally published by the War Department have been exhausted and unobtainable for many years. The present edition comes in two volumes, bound in silk cloth. Volume 1, 724 pages of text, and Volume 2, 311 maps. The price is \$10 a set.

# INSTRUMENTS AND APPLIANCES

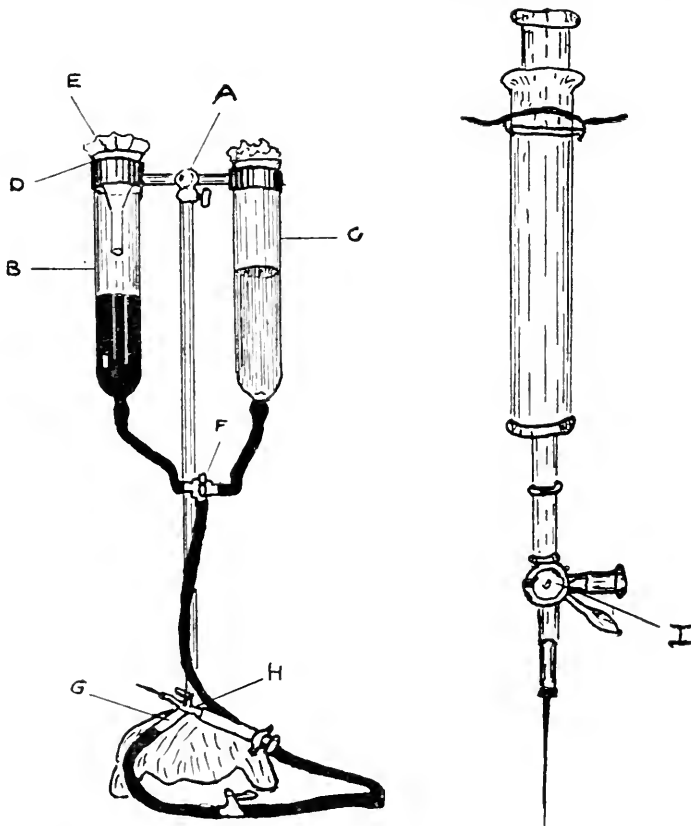
## A NEW APPARATUS FOR THE ADMINISTRATION OF ARSPHENAMIN

By LOYD THOMPSON, M.D., F.A.C.P.,

*Lieut. Colonel, Medical Reserve Corps, United States Army*

(With two illustrations)

Although new types of apparatus for the administration of arspnenamin have been described almost *ad nauseam*, there still seems room for improvement, and certainly many physicians still employ types which are very crude indeed. Not more than a year ago I saw, in two of the



largest and best known syphilis clinics of the country, arspnenamin being administered by the so-called open method. Briefly, this method consists of inserting a needle into the vein of the patient and allowing

the blood to run out over the patient's arm and the table until the physician is assured the needle is well within the lumen of the vein. He then connects the needle with the arsphenamin container and allows the solution to flow into the vein by gravity.

To my mind there is absolutely no excuse for this method. Most patients at best do not like to see their blood run all over the table, and for some it is extremely disagreeable even to the point of causing fainting. Then, too, the soiling of the table, the danger of infection to the physician and the time occupied are decided disadvantages.

Other methods which have been proposed are perhaps less disagreeable but not much more efficient.

These, then, are my excuses for describing at this time the apparatus which I have been using for the past two years and which seems to me to meet all requirements and is open to no objections.

It consists of an ordinary stand, *A*, and two graduated cylinders, *B* and *C*. A glass funnel *D* is placed in the cylinder *B* used for the arsphenamin, which is filtered through the sterile filter paper *E*.

The two cylinders are connected by means of short pieces of rubber tubing to a glass three-way cock *F*. This in turn is connected by means of a long piece of rubber tubing to a glass "window," *G*, which fits into a special metal three-way cock *H*. An ordinary Luer needle and a 5 c.c. Luer syringe complete the apparatus.

The method of procedure is as follows: Normal saline is placed in the cylinder *C*, the air forced out of the rubber tubing and the arsphenamin filtered into cylinder *B*. The three-way cock *F* is so turned that the normal saline will flow through the rubber tubing. The syringe is grasped in the right hand and the needle inserted into the vein, slight traction is exerted upon the plunger of the syringe until the blood is seen to flow freely into it or until a sufficient amount of blood is collected for a Wassermann test. The tourniquet which has been placed about the arm above the elbow is removed, the three-way cock *H* is turned so that the normal saline will flow into the vein and the syringe disconnected from the three-way cock. When it is seen that the saline is flowing freely and that no puffing of the arm near the insertion of the needle is taking place, the three-way cock *F* is turned so that the arsphenamin will flow into the rubber tubing. After a sufficient quantity of arsphenamin has run from the cylinder, the three-way cock *F* is again reversed and the normal saline is permitted to flow until the arsphenamin is all washed from the rubber tubing. After a trial or two it is easily determined just how much saline is required for this purpose. The three-way cock *H* is then turned to cut off the flow entirely and the needle removed.

The advantages of this apparatus are:

1. Its ease of operation. No assistant is needed.
2. The avoidance of spilling any blood.
3. The absolute assurance that the needle is in the vein before the arsphenamin is permitted to flow.
4. The ability to collect blood for a Wassermann at the time of administering the arsphenamin without the necessity of performing a second venepuncture.

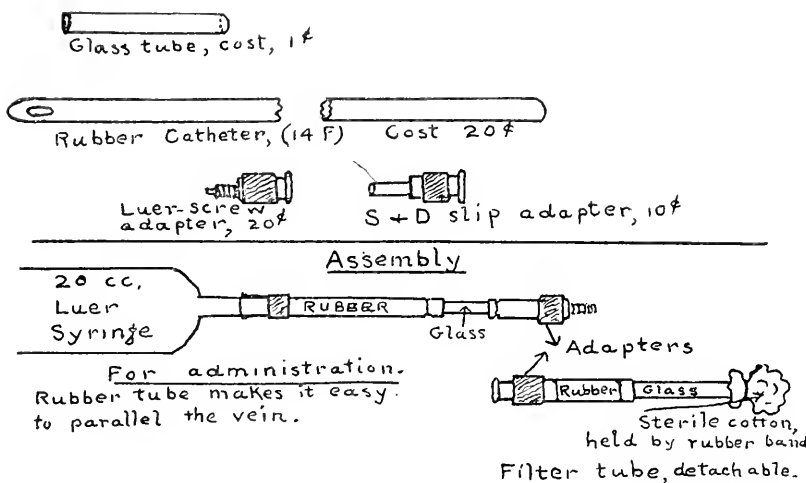
## THE ASSEMBLY OF SIMPLE INEXPENSIVE MATERIAL TO FACILITATE THE FILTERING AND ADMINISTRATION OF ARSENOBENZOL.

By SHELBY C. SPENCER, M.D.

*Formerly Major, Medical Corps, United States Army*

(With one illustration)

### Material



*Directions for use:* (1) Sterilize the complete outfit. (2) Assemble syringe and wash with sterile water as usual. (3) Make solution of Arsenobenzol. (4) Attach filter tube and fill syringe. (5) Detach filter tube, attach needle and proceed as usual. (Sketch by W. M. McKinney.)

## BOOK REVIEWS

DIAGNOSTICS OF INTERNAL MEDICINE, by Glentworth Reeve Butler, M.D., Sc.D., LL.D., Senior Physician to the Methodist Episcopal and the Brooklyn Hospitals. Fourth edition, revised. Pp. 1416; cloth. Price \$10.00. New York: D. Appleton and Co. With four colored plates and 322 illustrations and charts in the text.

This well-known book on medical diagnosis has undergone considerable revision since the last edition. There have been changes and new material added on the subjects of the functional tests of the kidney, blood chemistry, blood pressure, cardiac arrhythmias, and the examination of the heart, blood, nervous system, stomach, and intestines. The sections on diseases of the kidney and the endocrine system have been fully revised and enlarged to incorporate the recent advances in these fields. Other topics that have been changed in this edition are acidosis, Vincent's angina, hilus tuberculosis, botulism, effort syndrome, diverticulitis, and the effects of war-gas poisoning.

This volume has met with widespread popularity on account of its practical presentation. The arrangement of the subject-matter of the former editions has been followed in this one. The first part is concerned with the study of symptoms and their indications, the second with the study of diseases and their characteristics. The value of this arrangement lies in the ease with which symptoms fully described in the first part of the book can be verified and classified as part of a symptom complex of a disease fully described in the second part. What is of particular value is the full and complete description of methods of examination and of eliciting physical signs. In short, there is here included in one volume subject-matter that has been available heretofore in several, and the busy clinician will appreciate this accessibility.

This book has for many years held a place as one of the most valuable works on medical diagnosis in the English language. The present edition in bringing the subject matter up to date will prove invaluable to every physician.

L. A. NEWFIELD, M.D.

ANNUAL REPORT OF THE MEDICAL DEPARTMENT OF THE UNITED FRUIT COMPANY. Pp. 110, illustrated. Sent to any physician free of charge on application to the United Fruit Company, Boston, Mass.

This is a unique publication, remarkable for the extent and the character of the work which it sets forth. An annual medical service which is expressed in six figures commands attention. The number of patients cared for by this department in the tropics last year was 208,000, of whom 33,000 were non-employees, the service being distributed over nine large divisions each with its hospitals and hospital and field dispensary.

Of malarial fever, the disease most prevalent, there were 36,278 cases with 167 deaths, a commendable record. Methods of prophylaxis and treatment of malaria are given with results. Hemoglobinuric (blackwater) fever, smallpox and alastrim, hookworm, bacillary dysentery and other diseases of tropical countries are discussed. The subject of venereal disease is given full attention. Of yellow fever, fortunately, the medical director is able to state that no cases have occurred.

Tables giving vital statistics, records of mortality, of transmissible diseases, classification of diseases treated in the different divisions and other records of importance present the entire work of the department in condensed and graphic form.

A final chapter, "General Recommendations Concerning Sanitation and Prevention of Disease in the Tropics," will be valuable to many who are called upon to advise in this respect.



THE SURGICAL TREATMENT OF NON-MALIGNANT AFFECTIONS OF THE STOMACH, by Charles Greene Cumston, M.D., and George Patry, M.D., Lecturers at the University of Geneva and Members of the Surgical Society of Switzerland. Pp. 337. Philadelphia and London: J. B. Lippincott Company. Price \$5.00.

At the recent meeting of the American Surgical Association in Washington, in May, a considerable portion of the time was allotted to a symposium upon the surgery of non-malignant diseases of the stomach. Eleven papers were presented, and of these nine had reference to gastric and duodenal ulcers. At the last meeting of the American Medical Association in St. Louis in May, a symposium on peptic ulcer was presented before the surgical section, in which four papers were read having their titles practically the same as those presented at the American Surgical Association meeting, as an example, "The Relative Value of Medical and Surgical Treatment of Gastric and Duodenal Ulcer and the Indication for Each." All of these papers, at both meetings, were read and discussed by surgeons and several physicians who, by their writings and activities in medical meetings, have acquired more or less authoritative positions, and whose knowledge, based upon experience, is fairly worthy of consideration. There is a rather univresal renewal of discussion as to the relative merit of medical and surgical treatment of peptic ulcer. This is evidenced by the numerous papers and discussions at medical meetings, and papers in contemporary literature, both American and foreign. The book of Doctors Cumston and Patry discusses the subject of gastric and duodenal ulcer in a much broader and more analytical manner than it is possible to do in a paper suitable for presentation before a medical society. The authors in their preface call attention to the fact that surgeons are not in accord as to the merits and demerits of various surgical procedures. Their own work is based upon a study of data acquired in the past twenty years in the domain of gastric surgery, and their endeavor has been to make the monograph a medico-surgical treatise. Details of differential diagnosis are not elaborated, neither are those of operative technique, but rather operative indications and the results obtained, and the special indications of such procedures in the different types of medical lesions which are most commonly met with, such as stenosis, ulcer, gastric dystopia and dilatation, nervous dyspepsias, disturbances of the gastric secretions, tuberculosis, syphilis, and traumatic lesions of the stomach. In discussing all of these subjects the book is divided into sixteen chapters. Without any elaborating description of the different kinds of technique employed upon the stomach in the treatment of non-malignant diseases and their complications and consequences, an interesting chapter has been devoted to the different operative procedures and their development, and to whom proper credit for this work should be given. It is rather worth while to remember, and with sufficient humility to appreciate, that there are very few operations upon the stomach in use today which have for their originality American genius; examples, the Murphy button used occasionally in gastroenterostomy, and the Finney gastroduodenostomy. In the latter instance, however, it appears that Villar first performed this operation in France. "Sometime later Finney of Baltimore resorted to an operation similar in principle but which, nevertheless, differs in its details from Villar's technique."

The general scope of the book may be best understood by giving a list of the headings of its chapters. Chapter 1, Operative Procedures; 2, Gastroenterostomy; 3, Pulmonary Complications and Operative Shock; 4, The Resections; 5, The Stenoses; 6, Gastric Ulcer: Its Etiology, Pathogenesis, Pathology and Clinical Types; 7, The Operative Indications in Typical Gastric Ulcer; 8, The Indications for Operation in Hemorrhagic Ulcer; 9, Painful Gastric Ulcer; 10, Perforated Gastric Ulcer; 11, Gastric Dystopias; 12, The Nervous Dyspepsias; 13, Dilatation of the Stomach; 14, Tuberculosis and Syphilis of the Stomach; 15, Disturbances of Secretion; 16, Traumatic Affections: Contusions, Wounds and Foreign Bodies in the Stomach.

A study of the opinions expressed in Washington and Saint Louis and a study based upon the experiences of Cumston and Patry, and the analyses of their opinions of the work and writings of English and Continental physicians and surgeons, would seem to the writer to indicate that the foreign gentlemen were in the habit of making very careful investigations of their stomach cases, upon which to base their deductions, and that in the doing of this a wider and more accurate knowledge of chemistry, physiology, and pathology was in evidence than is apparent in this country.

The book under discussion is somewhat prolix; parts of some of the chapters are rather elementary; there are repetitions which would appear unnecessary. Nevertheless it is a valuable book as well for the physician as the surgeon, and as Sir Berkley Moynihan says in his Introduction, "a fresh and intimate study of the whole subject is urgently needed, and consequently a work of this kind, written by surgeons who have devoted great talents and a wealth of care to a close study of these affections and their treatment, will be eagerly welcomed in every land."

JOHN E. SUMMERS, M.D.

### BOOKS RECEIVED

NEW AND NONOFFICIAL REMEDIES, 1922, containing description of the articles which stand accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1922. Cloth. Price, postpaid, \$1.50. Pp. 417—xxxiv. Chicago: American Medical Association. 1922.

ESSENTIALS OF LABORATORY DIAGNOSIS, by Francin Ashley Faught, M.D. Seventh revised and enlarged edition. Philadelphia: F. A. Davis Company, 1921. Price, \$4.50 net.

WITHIN THE ATOM, by John Mills. Second edition, revised. New York: D. Van Nostrand Co. Price, \$2.00 net.

THE PRACTICE OF MEDICINE, by A. A. Stevens, M.D. Octavo of 1,106 pages. Philadelphia and London: W. B. Saunders Company, 1922. Cloth, \$7.50 net.

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## Obituary

### COMMODORE JOHN CROPPER WISE, MEDICAL CORPS, UNITED STATES NAVY, RETIRED, 1848-1922

Medical Director John Cropper Wise, United States Navy, died at the U. S. Naval Hospital, Washington, D. C., on June 12, 1922. Born in Virginia, October 7, 1848, he was commissioned an assistant surgeon in the Navy April 28, 1870. During his first cruise he served on the *Savannah*, *Guerriere*, *New Hampshire*, *Tallapoosa* and *Gettysburg*. He was promoted to the grade of Passed Assistant Surgeon June 8, 1874, while he was on duty at the Naval Hospital, Philadelphia.

During his second cruise he was attached to the *U. S. S. Despatch* from May, 1875, to July, 1878. After a short tour of duty at the Navy Yard, Norfolk, he returned to the Naval Hospital, Philadelphia, where he remained until March, 1881. He was attached to the *U. S. S. New Hampshire* from August, 1881, till April, 1884, during which time he was commissioned as Surgeon. From September, 1884, until May, 1887, he was medical officer of the *U. S. S. Jamestown*.

On leaving this vessel he was ordered to the Torpedo Station, Newport, R. I., where he served until September, 1890. He then went to sea on the *U. S. S. Alliance*, on which vessel he served until April, 1893. Various duties in Washington occupied his attention until June, 1897, when he went to sea for the last time. During this cruise he was attached to the *U. S. S. Philadelphia* and to the *U. S. S. Baltimore* until March, 1899.

He was promoted to the grade of Medical Inspector March 20, 1896, and to that of Medical Director in February 7, 1900.

After his last cruise he returned to Washington and served on various boards until August, 1905, when he was ordered to the command of the U. S. Naval Medical School in Washington, in which capacity he served until September, 1908. He was a member of the Naval Retiring Board and of the Naval Examining and Naval Medical Examining Boards until September, 1910. He was placed on the retired list at the age of sixty-two on October 7, 1910.

Dr. Wise was noted for his professional attainments. During the later years of his active service he represented the Medical Department of the Navy at many conventions of medical and scientific men. He was a delegate to the Tuberculosis Congress held in Baltimore during January, 1904, and to the meeting of the Association of Military Surgeons held at St. Louis, Mo., in October of the same year. He was a delegate

to the International Medical Congress which met in Lisbon, Portugal, in April, 1906, and to the Red Cross Conference which was held in London in June, 1907.

Dr. Wise took an active interest in the Association of Military Surgeons of the United States and was president of that organization during the years 1903 and 1904. For years he was an active contributor to its work and literature. A fluent and interesting writer, his contributions to medical literature embraced essays on a wide range of subjects.

Dr. Wise was of distinguished appearance, sympathetic and broad minded. He will be held in affectionate memory by his associates.

# THE MILITARY SURGEON

VOL. LI

AUGUST, 1922

NUMBER 2

## MEASURES FOR THE DEVELOPMENT OF ORGANIZATION AND EXTENSION OF USEFULNESS OF THE MEDICAL RESERVE CORPS' SYSTEMS OF THE GOVERNMENT

BY COLONEL JEFFERSON R. KEAN  
*Medical Corps, United States Army*

HONORABLE MENTION, WELLCOME PRIZE ESSAY, 1921

A WAR of any considerable magnitude is like a mountain range which the traveler crosses with pain and difficulty, and when he has descended into the valley on the further side all his former road is lost to view. So the events which happened before the World War seem already ancient history, which we recall with difficulty and which seem quite disconnected from the problems of today. None the less, however, today is the child of yesterday, and to consider the Reserve of the present and the future, it is necessary to orient ourselves by a brief historical retrospect.

*Origin of the Reserve.*—The genesis of a Reserve for the military services and the Public Health Service is to be found in the draft of a bill for the reorganization of the Medical Department of the Army which the Surgeon General, Gen. R. M. O'Reilly, handed to the Secretary of War, the Hon. Elihu Root, on Christmas Eve, 1903. This draft was accompanied by a memorandum setting forth the unfortunate position in which the Medical Department had been placed by the Act of February 2, 1901, reorganizing the Army. This act was, in most respects, a fine piece of constructive legislation which was intended to modernize the Army and rectify the defects of organization which had been demonstrated by the Spanish War, and it was prepared under the personal direction of the great secretary. But it seemed that when he came to the provisions for the Medical Department he nodded, as even Jove is wont at times to do, and some malign sprite seized his pen and wrote these paragraphs, which, as General O'Reilly showed, were blind

to the dearly purchased lessons of the late war and without vision for the needs of the future or even of the present.

The Surgeon General's memorandum discussed these lessons and showed with convincing logic the necessities of the service. But he went further, and offered a plan for the organization of a Medical Reserve Corps which should be the agency for expansion in war—the first Reserve ever provided in the American Army. The clear intelligence of Mr. Root was quick to grasp and prompt to approve these suggestions, and this was the beginning of the system which has now become the corner-stone of our new military policy. Mr. Root demonstrated his innocence of responsibility for this bad feature of his own law by the promptness with which he supported General O'Reilly's request for its amendment. Although the corrective legislation was also heartily supported by the succeeding Secretary, Mr. Taft, and by the President, who sent a special message to Congress urging it, and had the somewhat unenthusiastic approval of the War Department, more than four years went by before it was enacted into law by the Act of April 8, 1908.

*Change in Mode of Expansion of the Medical Corps in War.*—Many of the most distinguished men of the medical profession hastened to enroll in the new Reserve Corps, and it was soon evident that in the new relation which had been established between military medical officers and the medical profession, a great moral support had been gained, as well as an invaluable means of expansion in war. The first enrollments were from among the older men of the profession, many of them, as critics pointed out, too old for active military service, but they were the leaders of the profession, and, where they led, the younger member would follow when the need came. And the new system placed definitely in the hands of the Surgeon General the means of preparedness and of control over the appointment of temporary personnel, so that the eyes of the profession would be turned to him and not to political agencies. The expansion in war would be from a selected list, the Reserve, instead of the two sources available in the Spanish War, volunteer surgeons politically appointed and contract surgeons who lacked the prestige and authority of a commission and whose pay was certainly not adequate to attract men of high standing in the profession, such as the splendid body of medical men who came forward for service in the World War. The Medical Service of the Navy was not slow to perceive these advantages and to wish to share them, so they asked and promptly obtained from Congress.

in 1912, a provision of law providing for a Reserve Medical Corps and Dental Corps for the Navy, similar to those existing in the Army.

*Extension of the Reserve to Include the Whole Army.*—The year 1916 saw a great extension in the use of the Reserve. The World War had begun to cast its shadow over our country and questions of preparedness received serious consideration. The Reserve system was extended to include the line and other staff corps besides the medical. The grades authorized were up to and including that of major. This was done for the Army by the important National Defense Act of June 3, 1916, and for the Navy by the similar Act of August 29, 1916. It was with this law that we entered the war and organized the first fifty base hospitals and other medical units, some under Red Cross auspices, in advance of our declaration of war, and others soon thereafter. Additional legislation was needed to give temporary officers promotion to the higher grades, but this came in due time with the creation of the National Army. The Reserve Corps of the medical services of the Army and Navy were, therefore, organizations which made good in the World War and carried these services triumphantly through the greatest crisis which had come to them in the course of our national history. That there were defects both in the law and in its application must be admitted, since nothing human is perfect, but that they were so few and of such small moment must be a matter of legitimate satisfaction to the creators and sponsors of the Reserve in both military services.

The history of the Reserve has been heretofore, in a large measure, that with the Army alone, since the Army was the pioneer in its organization. The question of expansion in war is likewise a far more serious and vital one for the Army than for the Navy or the Public Health Service, since the Navy is always more or less on a war footing and its expansion is limited by the time needed to build capital ships. While the Public Health Service has increased demands made upon it in war, they are naturally far less than for the military services, and its peace expansion to meet the emergency of an epidemic, which is usually local, does not ordinarily place a severe strain on its organization. But for the Army there is no limit to its expansion for war except the number of men in the nation of military age and physically fit to bear arms, while for its Medical Department the only limit of expansion is the number of medical men in the country of suitable age, physical fitness

and professional qualifications not already enrolled in the other services. In discussing the question of the best organization of the Reserve it seems, therefore, logical to consider it with reference first to the Army, which has the greater and more imperious need, and then with reference to the needs of the sister services.

The chief defect, or rather deficiency, in the Army Medical Reserve, when the United States entered the war, was that it was far too small for the immediate, much less the ultimate needs of the Army. It therefore had to undergo an immediate and vast expansion, with the inevitable confusion and errors of selection and assignment which must always result from such a condition when no provision has been made in advance for enrollment, classification, selection and assignment. Under such conditions the square pegs seek and occupy the round holes with vexatious frequency. The failure to foresee the need and to provide the necessary scheme was, it is true, a fault of administration rather than of law, but it is none the less one of the lessons of the war which we must take to heart. It is, in fact, now well recognized as a shortcoming which is being studied with a view to its correction for the future. If the organization of the Reserve provided for in the National Defense Act of June 4, 1920, which is now in course of being carried out, is successful, and if the Medical Department is entrusted with the organization of the units included in the medical regiments, as well as the larger units of the S. O. S., the mobile, evacuation and general hospitals, this will provide an admirable classification and organization made in time of peace, without haste or confusion, and all will go well. But if the officers of the line entrusted with the organization of the divisions and corps, through self-sufficiency or jealousy of authority, or any other motive or reason, undertake to exclude the Medical Department from its rightful and proper role in this work of organization, the hustling and politically active square peg will inevitably be much in evidence, and the work ill done in peace will have to be undone and done over under every disadvantage by the Medical Department in time of war.

*New Military Policy of the United States.*—The present military policy of our country—and it now has, for the first time in its history, a military policy laid down by law—is succinctly stated by the President as follows:

It provides for a small Regular Army to be augmented by great citizen forces in the event of national emergency. This is our traditional military policy. But whereas, in the past, these larger



war forces have been extemporized after the occurrence of an emergency, the new law wisely provides that the framework of their organization shall be established and developed in time of peace, in so far as this is practicable, through the voluntary service of our patriotic young men. The Army of the United States, as defined in the new law, comprises the Regular Army, the National Guard and the Organized Reserves. Every patriotic citizen should encourage the development of these forces, each within its proper sphere.

By this organization of the Reserve, in which it is expected to enroll the veterans of the World War, it is proposed, in the words of an able exponent of the plan, "to perpetuate the framework of the organization developed in the World War so that its tremendous cost can be funded as a permanent investment for all time."<sup>1</sup>

*Method of Supplying Replacements to the Reserve.*—This organization of the Reserve has been made the chief duty of the General of the Armies of the United States, and he has been relieved of responsibility for the routine administration of the War Department in order to devote himself to it. The plan which has been adopted contemplates the organization of the cadres of six field armies which are localized in the nine corps areas, except the S. O. S. units, which are organized by the War Department. These armies include the Regular Army and the National Guard, as well as the Reserve. The Reserve units, which compose by far the greater part of the units, are cadres composed of officers only, and it is intended to officer them, as far as possible, with the trained veterans of the World War. All the medical units required by a modern army are included in this Organized Reserve. The selection of the properly qualified medical officers for the various units, hospital companies, ambulance companies, laboratories, specialists for the staffs and all-round men for duty with line organizations, as well as the professional and administrative staffs for general, evacuation and mobile hospitals, constitutes a complete scheme of classification and assignment, which leaves very little undone in the way of methodical organization.

The trained veterans who will fill the cadres of the Reserve units at first will, however, in the course of time pass out and will have to be replaced by a new generation of young men who will have no practical knowledge of war. The heel of Achilles in this admirable plan is its dependence on volunteers. The faith of our people and of their representatives in Congress in volunteer soldiers is as perennial as it is pathetic. Neither Washington's vigorously worded

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<sup>1</sup>"Military Policy of the United States," by Col. John McA. Palmer, A. D. C., Bul. 19, W. D., 1921.

record of his experience in the Revolution, nor the burning of the city of Washington in 1814, nor the Battle of Bull Run in the Civil War, nor the historical teachings of Upton and Huidekoper have availed to shake it. The teachings of history and the pleadings of the army chiefs in Washington did, fortunately, prevail in 1917, but were not equally potent with Congress when the National Defense Act was being considered in 1920. Now it is only natural and to be expected, as the impressions of the World War grow dim in the distant past, that the interest in military matters of coming generations will gradually diminish. They will be told by optimists that we will never have another war, and by pacifists that to prepare for war is to encourage war. The followers of a certain benevolent individual, but far from good citizen, who, as a result of the Yuletide beneficence of the President, has recently transferred his residence from Atlanta to his home in Indiana, may even ask them to sign a pledge never to wear a uniform or assist in any act of war. Therefore the future of the third constituent of the U. S. Army cannot be considered as altogether assured.

The plan for the training of the reserve officers of the future is through the Reserve Officers' Training Corps Units established in connection with schools and colleges throughout the country, and also by means of the Citizens' Military Training Camps established each summer.

This feeding system has been evolved with reference to the needs of the line, and its applicability to the professional students of the Medical Department has been assumed. Whether this assumption will be justified by the event, only time will show. The four-year curriculum for a medical education is already crowded to the limit of compressibility, and the constant advances of medical science, with the development of new specialties and new methods, demand its extension in spite of the weighty objections thereto. Under these conditions medical faculties and medical students naturally turn an unsympathetic ear to the request for a place in the curriculum for a Medical Reserve Officers' Training Corps Unit. It is a gratifying evidence of the patriotic spirit of the medical profession that Medical R. O. T. C's. have been established in eighteen medical schools and that four or five more have agreed to their establishment this year. As, however, the enrollment of the students in most of these units is voluntary and as the interests of our young men in military matters may be expected to diminish as the stimulating memories of the World War recede into the past, it is by no

means certain that all of this promising crop of units will survive and flourish. If it should prove a success, the graduates will be well grounded in the basic principles of military medicine and should prove to be valuable recruits, as far as they go toward filling the vacancies in the Reserve.

But the Medical Reserve should not place its entire dependence upon the R. O. T. C. system. Fortunately for the medical service, the amount of special training needed to convert a well-grounded physician into a competent medical officer is less than the special training demanded of a line officer. The medical officer does not have to learn a new profession, as does the line officer, but only to practice his profession under novel and special conditions. The amount of administrative work required of medical officers varies widely with their duties. For some it is great and important, and for these positions trained men must be found, but many will have professional work only and will be able to get along if they know how to salute the colonel and make out a pay voucher. The same thing is certainly true, to a considerable extent, in the Navy also, where the Reserves are used chiefly for professional work, while for the Public Health Service Reservist no military training is required. The law wisely does not tie up the Medical Section of the Reserve to the R. O. T. C. and training camps for its supply of new blood. If it did, a severe attack of anemia might be apprehended for the Medical Reserve.

Provision is made for the admission of medical men into the Medical Section in any grade by examination. Special Regulations 43 make a general provision for the eligibility for appointment by examination of candidates who comply with the other requirements and who are "graduates of reputable medical schools which are legally authorized to confer the degree of M.D. or persons who are legally qualified practitioners in the states in which they reside and are engaged in the practice of their profession; also persons who have served satisfactorily for one year as interns in army hospitals." The regulations governing these examinations are very general, and the character of the examination is left largely to the discretion of the corps area commander, who is authorized to convene the examining boards. For established practitioners, their professional knowledge is determined by the credentials submitted by them instead of actual examination. This opens a wide door for those who are the best of all reservists, the men who have demonstrated their fitness by success in the practice of their profession.

Our chief difficulty with these has been, and will always be, to persuade the busy practitioner to assume any obligation which may make serious demands upon his time, when everything which he has of time and energy is already taken up in the practice of his profession. It is not easy to persuade the general medical practitioner whose time is always at the call of others and who has none, either by day or night, which he may call his own, except the brief summer vacation, to mortgage any of it for purposes of public service in which his personal interest is rather vague. This is our chief difficulty at present, and it will always remain so, as far as this class of reservists is concerned.

If, however, we can enroll the young medical graduate at the beginning of his career, before his time is all claimed by the demands of his profession, this difficulty will be avoided. It seems desirable, therefore, to supplement the recruiting of the Reserve by tapping the supply at the source through other channels than the Medical R. O. T. C.

*Size of the Medical Reserve.*—Let us consider, then, the question of size of the great Reserve which will be sufficient according to the expanded vision and dearly bought wisdom of today. The maximum strength of the enrolled medical profession during the war was, approximately, as follows:

Army Medical Department.....	31,435
Navy Medical Department.....	1,700
Public Health Service, about.....	1,000
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Total.....	34,135

Their present enrolled strength is, approximately,

Army Medical Department.....	6,500
Navy Medical Department.....	1,679
Public Health Service.....	1,022
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Total.....	9,201

If we estimate that the Army Medical Reserve in peace should be able to provide for the six field armies for which it is planned to provide cadres, and allow for the Navy and Public Health Service a 50 per cent increase over the numbers which they have at present and with which they appear to be quite content, we would then need.

Army for six field armies.....	16,823
Navy .....	2,519
Public Health Service.....	1,533
Total.....	20,875

The figure for the Army is based on an allowance of 7.5 per M. of medical officers, including S. O. S. units.

*Annual Loss.*—Accepting the total of 20,875 as the strength at which the combined Reserve should be maintained, let us estimate, if possible, the annual loss from this body from deaths, disability, resignations, etc., which must be made good. A study of large groups of medical officers of the Regular Army, taken at several periods in the last thirty-seven years and followed through to the last annual register, shows that the annual loss has averaged about 3.25 per cent. The various factors which go to make up this ratio may be different in the Reserve. The number of retirements for disability will be greater for the former because of the rigid supervision over the physical fitness of the Regular Army, maintained by means of the annual examinations. On the other hand, resignations will doubtless be much more frequent in the Reserve, since they surrender thereby a liability and not an asset. We may fairly assume that the annual loss from the Reserve will be somewhat greater than from the Regular Corps, and it will be certainly not excessive to place it at 4 per cent. Applying this ratio to the figure stated, we find that the annual wastage will be 835, which number must be supplied year by year to maintain the Reserve of the three services. As with the disappearance of the veterans and the passing into the more and more distant past of the World War, interest in military matters gradually diminishes, this loss certainly will not diminish but may rather be expected to increase. It will be two or three years before the Medical R. O. T. C. begins to turn out any graduates, and thereafter, if the number amounts to 400 a year and maintains that figure, the system will be doing well. We must be prepared to obtain more than half of our recruits from other sources than the R. O. T. C., which, it should be remembered, are not available for other reserve services than that of the Army. In selecting fit men it is useless to talk of examinations. The young graduate will tell you that he is fed up on examinations and only some inducement greater and more immediate than the Government can offer will induce him to face another. It is wise, therefore, to accept the result of tests which the candidate has already under-

gone and to have our work done for us by an agency in which we may have confidence. This also will save the expense to the Government and to the candidate of appearing, at some other time and place, before a board for examination.

*The National Board of Medical Examiners.*—Such an agency admirably fitted for our purpose exists in the National Board of Medical Examiners. This board, which was organized about six years ago through the initiation of Dr. William L. Rodman, then president of the American Medical Association, has for its purpose the fixing of a high national standard for the practice of medicine in the United States, which may be accepted by the individual states and by other bodies holding medical examinations, and also by foreign countries. It will also do away with the inconveniences which are encountered by physicians desiring to practice in other states than those of which they are residents. The progress of this body toward national recognition has been steady and continuous. Although its establishment by Federal law would not be constitutional, this has been decided not to be necessary so long as the validity of its examinations is recognized by the states. The examining and degree conferring boards in Great Britain are, in the same way, private organizations, although acting under royal charters. Twenty states now accept the certificates of the National Board of Medical Examiners as equivalent to those of the state boards, and in eleven other states where legal restrictions exist to prevent such recognition, movements are on foot to remove them. The examinations of the board are accepted by the American College of Surgeons and the Mayo Foundation at home, and abroad by the Conjoint Examining Board of England and the Triplicate Qualification Board of Scotland. Likewise, their examinations have been accepted for admission to the Reserve Corps of the Army, the Navy and the Public Health Service.

The number of graduates examined has not heretofore been large owing to several causes, such as the lack of knowledge of the advantages on the part of medical students, remoteness of graduates from the place of meeting of the board and the difficulty of a strict examination covering, at one time, all the subjects in the curriculum. Arrangements are under way, however, to remove these objections by permitting the examinations to be taken for different subjects at different times, with a final concluding practical examination after the completion of the candidate's hospital service. The examinations will also be held simultaneously in a number of

cities. It is to be expected that this board will, under such broad policies, develop into a great national institution. Here we have already created and functioning an admirable selecting and recruiting agency for the Reserve. It has already been stated that its examinations were accepted by the government services, but for the Army this was before the publication by the War Department of the Regulations for the Officers' Reserve Corps (Special Regulations No. 43). Under these regulations the certificate of the National Board of Medical Examiners can, at present, only be used as a credential, to be considered by the official examining boards, and some modification of Special Regulations No. 43 would be necessary for the use of the National Board in the manner proposed. Paragraphs 104 and 105 are as follows:

104. *Time and Place of Examinations.*—Department and corps area commanders are charged with convening examining boards and conducting examinations. All candidates will be examined as soon as practicable after approval of applications, and as near as practicable to their places of residence. Boards may be convened by a department and corps area commander at places within his territorial jurisdiction otherwise exempted from his control.

105. *Examining Boards.*—Examining boards will consist normally of three officers of grades not lower than that for which the candidate is examined. If the exigencies of the service demand, boards of a less number of officers may be convened. When practicable, reserve officers may be utilized as members of examining boards but will not be placed on active duty for this purpose. A medical officer may be detailed as a member of the board, but this is not required, as the board may consider a report of physical examination by any medical officer of the Army of the United States.

Paragraph 104 should be amended so as to add, at the end of the first sentence, "except in the case of special boards convened by the War Department." Paragraph 105, which is quoted to show the organization of these boards, would not need any amendment. As there is always a representative of the Medical Corps on this board and presumably one or more members of the Medical Corps, O. R. C., this could be readily effected by the appointment by the War Department of an Examining Board composed of these members of the National Board to take up with each successful examinee, who seems desirable, the matter of a reserve commission and to proceed at once to make out a report recommending him to the War Department for commission. As the time of the medical examiners is fully occupied with their duties on the National Board, a medical

officer not a member of the National Board would have to be detailed as recorder of this Army Examining Board to prepare all papers and make the physical examination.

Concerning these physical examinations, something will be said later. This board would be organized by an order of the War Department and be permanent in character, with such changes in personnel as might be necessary from time to time, and its proceedings would be forwarded directly to the War Department. If the other government medical services should have need of additional reservists, arrangements would naturally be made between their representatives on the National Board and the army representative for the presentation of the claims of all the services to the attention of the examinee at the same time, so that he could make a choice as to the service which he would prefer. The successful examinees of the National Board of Medical Examiners will, without doubt, in the future, be the elite of the medical profession in this country, and in the way above outlined the patriotic call to service in the Reserve could be presented in an authoritative and convincing manner to each examinee.

*Inducements to Join the Reserve.*—It is a fortunate characteristic of the human mind that the normal healthy memory does not like to dwell on what is unpleasant, and so we find that the reminiscences of the past are of the pleasant and happy things, while disagreeable events are lost to view, as are the valleys and depressions in the distant landscape. For the veterans of the World War we find that the lapse of time mitigates the disagreeable impressions under which so many of the temporary officers left the service, due to the failure to give well-earned promotion, the long delays in releasing men from the service after the armistice, and the inevitable frictions and disappointments of the service. Then the spirit of comradeship and the patriotic zeal which has been fostered by military service brings them back to the service as reservists when they find that they are not only desired but are absolutely essential to the new scheme of national defense. For the graduates of the R. O. T. C. it may be expected that they will accept a reserve commission, since it is the objective of four years of instruction. But the recent graduate who is not an R. O. T. C. man but an examinee of the National Board may be found to be more difficult. For him, in addition to the patriotic appeal and the influence which the board may be able to exert, must be added the suggestion of useful and agreeable connections in the Reserve and the attractions of the



uniform. And in this connection it might not be out of place to suggest that the uniform might easily be made more attractive to young men by a restoration of the blue for social and ceremonial occasions. It should be not the severe and clerical looking blue blouse of 1916, but that with the smart and attractive brass buttons of thirty years ago. These buttons were removed in those prekhaki days when blue was worn in the field because they were supposed to furnish excellent bull's-eyes for the aim of sharpshooters. That they also attracted the gaze and admiration of the fair sex was proverbial, and the point is one worthy of consideration in making the service attractive to young men. The immense advantage which our brothers of the Navy have over us in this respect is one often noted but not, as yet, deemed worthy of imitation by the Army. Even small privileges are highly prized if they are distinctive of a select class and so distinguish a man from the common herd. It might be well, therefore, to add to that of a becoming uniform, the privilege of making purchases at all government stores, giving the commissary privilege in addition to that of buying uniforms and equipment, which the Reserve now enjoys.

It would be well, while seeking to make the reserve service attractive, to see to it that nothing is done to exclude or repel valuable men, and in this connection a few philosophical remarks on the subject of physical examinations for the Reserve might not be out of place.

*Physical Examinations.*—Physical examinations for officers are by no means an immemorial institution but have come into vogue within the memory of men yet living. They have been always favored by the Medical Department as promoting efficiency, and also promotion, and as being protective to the service and especially to the retired list. Their vogue has greatly increased in recent years and has, at times, been attended with more zeal than discretion. A distinguished general tells the story that he was examined, stripped, four times in less than two years in France, and after having embarked for home was recalled by wireless for a fifth physical examination. The requirement during the war, that all officers, temporary and regular, recommended for promotion, should be examined and certified to be physically fit for duty before being promoted, was a procedure for which no good reason could be given, and which not only greatly hampered the procedure of getting officers promoted but caused great injustice and bitterness by preventing the promotion of officers disabled by wounds, promotion which they had earned and which was due them. An officer who

has lost a leg could have been discharged just as well with an increased grade, and his feelings toward the Regular Army would have been much more kindly if his honorable wounds had been regarded as a reason in favor of his promotion instead of against it. Doubtless Procrustes was a military man, of mathematical education, since his craze for uniformity and his willingness to sacrifice anything to it, even a pedal extremity or two, have been characteristic of the *militaire de metier* ever since. Thus we find that the occasional suggestions of medical officers, that some relation should obtain between physical standards and the duties which the examinees are expected to perform have gone unheeded. The Finance Officer, whose duty is to sit at a desk, and the Chemical Warfare Officer, who is a laboratory man, must be as physically fit and active as the young cavalry man, who must ride all day, or the company officer of infantry, who must be able to march all day in mud and snow.

The procrustean physical standard has caused the loss of many highly trained officers of the staff because of disabilities which would not have reduced their efficiency for the duties which they would naturally be called upon to perform, but this, though expensive, was not serious so long as it affected the comparatively small Regular Army only. But the World War has taught us that modern war is a matter not of small armies but of nations, to which entire populations must contribute according to the ability of each individual man and woman. Thus the scientist may be a little shrimp weighing a hundred pounds and nearsighted, round shouldered, bandy-legged and with flat feet and hammer toes, and yet be a more valuable medical officer than a handsome six-footer with the figure of Apollo and a head full of fat.

The very excellent and carefully thought out Special Regulations for the Reserve, however, show the beginning of a realization of the fact that all officers need not have exactly the same qualifications by the distinction drawn in Section II, Paragraphs 14, 15 and 16, between reserve officers *for service with troops* and those *for special service*. For the former, physical endurance is rightly stated to be one of the essential qualifications, while for the latter it is stated that "The primary requisites, in addition to the fundamental qualities of moral fitness and general education, are satisfactory knowledge of and standing in some profession or occupation, with ability to adapt such knowledge to the requirements of military service." This shows excellent discrimination, but the procrustean spirit cannot be long suppressed and crops out later

in Paragraph 109, which provides that "Each candidate will be subjected to a thorough physical examination *conforming to the standards prescribed by the War Department.*" Do the standards prescribed for the reserve officer who is expected to serve (except for training) only in war differ from those for the Regular Army? Not in the slightest. Army Regulations No. 40-105 apply to Regulars, National Guard and Reserves with impartial rigor. All are reported on Form 395, A. G. O. Nothing is said of the distinction between duty with troops and special duty. It may be said, without exaggeration, that a strict and rigid application of Paragraph 109 will make the organization of an adequate Medical Reserve, as contemplated by existing orders, extremely difficult, if not impossible, because it would exclude, for inadequate reasons, so many of the ablest and best men in the profession. The corps area commander is charged in all other matters with the enrollment and organization of the Reserve, but for the waiving of a disability in a reservist, even if enrolled for special service, the supreme authority of the War Department must be invoked. And yet this physical examination by which such store is set and which, to the uninitiated, is a very disagreeable ordeal, decides nothing for the future but only for the present. Within a week an automobile may break his legs or an attack of quinsy affect his heart and your good man will be physically unfit. Since the examination, then, is informing only for the present, when we do not expect to use the man, and decides nothing for the future, when we expect to use him, but will have to be then repeated, why not postpone it until it is really needed and be satisfied with the certificate of the applicant that he suffers no mental or physical disability which will prevent his performing the duty of a medical officer? Then, the first time that he is called to active service, either for training or for duty in an emergency, let him have a physical examination with notation of the appropriate duty for which he is physically fit.

If this procedure is adopted, it would much facilitate the enrollment of reserve officers and we would not repel many good men, who, when there is no existing emergency, hesitate to exhibit their physical imperfections before a strange group of men and have them become the subject of a correspondence with the War Department.

In general, it seems safe, for the purposes of the Reserve, to assume that a physician who is physically able to practice his profession in civil life will be a useful man for some kind of special duty in the Army until the contrary is demonstrated when he is

called to active service, especially if he furnishes the certificate referred to above. This plan worked satisfactorily both for the regular and contract surgeons of the Army for many years after the Civil War, although there was much arduous field service against Indians. This may seem an abandonment of standards but when the standards do not apply it is time for them to be abandoned by all except the disciples of Procrustes.

At the Pantheon de la Guerre in Paris, one is admitted to a central stand, from which he sees a vast landscape stretching out in every direction from Paris as a center. Upon the dim horizon, to the north, are seen the spires and towers of the heroic cities, St. Quentin, Soissons, Rheims and Verdun. Winding along all the roads leading towards you pour the victorious armies in an endless procession of infantry and horsemen, artillery, tanks and all the various arms of modern war. At the front, immediately before you, stand out the military and civil chiefs of the Allies, with here and there the white dress and gracious profile of a Red Cross nurse or canteen server. So it will be in time with the history of the Great War. Now we are too near it to see things clearly, and the dust of the conflict is still in our eyes. But when we reach the platform of historical perspective, we will appreciate how nobly and with what personal sacrifice the medical profession did its part as reserve officers. It is certain that no American army, and it may be doubted if any army, ever had so excellent a medical service as our Medical Reserve Corps made possible. In the medical group of our historical panorama should stand forth conspicuously the white hair and clear-cut features of General O'Reilly, the founder of the Medical Reserve Corps.

#### RÉSUMÉ

1. The origin of the Reserve Corps system of the Army, Navy and Public Health Service was the Medical Reserve Corps, proposed by Surgeon General R. M. O'Reilly, U. S. Army, in 1903.

2. The Reserve made possible a rapid and successful expansion of the Medical Department for war, with the best elements of the medical profession, instead of the slow and unsatisfactory mode of enlargement by politically selected volunteers and contract surgeons, which had obtained in former wars.

3. The Reserve was extended to include the line and all staff corps of the Army by the National Defense Act of 1916. It was adopted by the Navy in 1912 and by the Public Health Service, October 27, 1918.

4. The defects of the Reserve in the spring of 1917 were that it was far too small and that there had been a failure to classify and organize it in anticipation of war. This work will be done in future by the organization of the Reserve now in progress, but to be satisfactory the Medical Department should be permitted to organize their own units.

5. A new military policy has been adopted for the United States which is based on the Organized Reserve. The weak point in this is its dependence on volunteers.

6. The medical service has, as sources of supply, the veterans of the war and, for replacements, the Medical R. O. T. C. and civil practitioners.

7. The number of reservists needed annually to keep the cadres full is estimated to be 835, of which the Medical R. O. T. C. will supply less than half.

8. The National Board of Medical Examiners will make an admirable recruiting agency for the best class of medical graduates to supplement other sources of supply. The War Department should organize an examining board in connection with the National Board.

9. Every effort should be made to make the Reserve attractive to young men. An attractive blue uniform for social and ceremonial occasions should be authorized, as in the Navy. The commissary privilege might well be extended to the inactive Reserve, which is now a part of the Army.

10. Physical examinations have been overdone of late in the Army and have been applied in a procrustean way. They are of no special value for reservists until called to active service and might well be postponed until that time. The standard of physical fitness should not be fixed but should be different for officers enrolled for special service from what it is for the service with troops. All good men are needed in war, and it is safe to assume that a man who is doing good professional work in civil life can do good work in the Army. Waivers of disabilities should be made by examining boards without reference to the War Department.

11. The Reserve Medical Corps made possible the mobilization of the medical profession for war and gave to our army a better medical service than any American army ever had.



# THE TREATMENT OF FRACTURES<sup>1</sup>

By MAJOR TOM. S. MEBANE

*Medical Corps, United States Army*

WHAT ARE the best methods of treating fractures? This is a timely subject for consideration as the stimulus of war has led to many advances in the methods of treating fractures. The greatest advance naturally has been in the methods of treating compound fractures. The necessity of splinting before transporting has been well established and a number of excellent transportation splints popularized. The improvement in end results and the shortening of the period of convalescence that followed utilization of physiotherapeutic measures and use of braces has been demonstrated on a large scale. These and other lessons, if applied to our present-day fracture problems, will do much to improve our results.

## TRANSPORTATION

There can be no question of the necessity for splinting every fracture that must be transported any distance, if the patient's comfort alone is considered. The war taught, further, that much of the shock seen in fracture cases is due to lack of efficient splinting. In this day and date it is as inexcusable to move a fracture case without first properly splinting as it would be for a surgeon to attend an accident case without his emergency bag. The splints and materials required for this purpose are few in number and should be available on every ambulance and in every institution where accidents are frequent.

The best series of transportation splints (1) was that recommended by the Splint Board of the American Expeditionary Forces. They combine the qualities of being light and allowing easy access to any wound with that of providing good fixation for the fracture. Under peace conditions, where most fractures are simple and distance and time of transportation short, all the splints recommended by the board are unnecessary. For the upper extremity fixation without traction is usually sufficient. Board coaptation splints for hand and forearm and fixation of the arm to the chest in cases of fracture of elbow, humerus, and shoulder girdle suffice. In the case of the lower extremity traction as well as fixation is advisable for hip, femur, knee, and upper leg fractures. The Thomas or

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<sup>1</sup> While on duty at Walter Reed Hospital, the writer had the pleasure of assisting in the instruction in fractures of officers of the Army Medical School. This paper is an effort to offer a practical method of treating fractures from what appeared to be the needs of these officers judging from questions, conversations, and examination papers.

Keller half-ring modification of the Thomas leg splint fulfils the requirements. Fractures of the lower leg and foot are most conveniently treated by fastening the leg on a Cabot posterior wire splint. A fracture of the cervical spine should be splinted in extension. A collar improvised from a folded newspaper gives good temporary fixation. A patient with fracture of dorsal spine, lumbar spine or pelvis should be transported recumbent on a Bradford frame or securely fastened on an ordinary litter, with a board underneath if there is much sagging of the canvas.

#### COMPOUND FRACTURE

The management of infected compound fractures by the combined methods of traction—suspension in a Balkan frame (2) and employment of the Carrel-Dakin technic (3) has been a great advance over former methods. The old idea that any result that saved the limb, no matter what the deformity, was a good result in such cases, no longer holds. By the use of these methods good position of the fragments can be maintained, infection controlled and ample access to the wound for dressing or employment of physiotherapeutic measures obtained.

One should never lose sight of the fact that under peace conditions most compound fractures can be converted into simple fractures by prompt application of iodine and a sterile dressing. The writer, two years ago, saw a war trained surgeon rush in and do a debridement on a pistol wound of the leg, already forty-eight hours old, with only punctate wounds of entry and exit and no signs of infection. Such surgery is inexcusable. Such wounds should be iodized, splinted and watched. Where there is laceration of the skin and soft parts with contamination of the wound by dirt and grease, the patient should be anesthetized and the skin about the wound thoroughly cleaned and iodized. After a liberal application of iodine to the wound a careful debridement should be performed, removing all bruised and devitalized tissue back to good bleeding tissue. Loose fragments of bone only should be removed. If operation is performed within eight hours of receipt of injury, the wound may be loosely closed with wick drainage. After eight hours the wound should not be closed but packed loosely with Dakinized gauze. If infection does not occur, the wound can be closed on the third day. A good plan is to introduce sutures at time of debridement, tying on the third day if wound remains clean. In frankly infected cases nothing should be done except to open widely and introduce Carrel tubes for treatment by Carrel-Dakin method. Further operation shall be deferred until sequestration or

tunnel formation has occurred, when appropriate operations should be performed and the wound Dakinized. It may then be allowed to heal from the bottom, or secondary closure done when the cultures show a sterile field. Even under peace conditions one should never neglect to administer an immunizing dose of tetanus antitoxin to all compound fracture patients.

#### SIMPLE FRACTURES

Many surgeons acquired considerable experience in the management of compound fractures during the war. Among those who had not had experience in the management of simple fractures before the war, there is a tendency to apply war-time fracture methods to the treatment of simple fractures as well as to compound. As a matter of fact the war has contributed little to our knowledge of the best methods of treating simple fractures. In the application of war methods to such fractures there is a tendency to depend on the splint to obtain reduction, and also a tendency to unduly prolong immobilization. In compound fractures, particularly gun-shot fractures, there are associated injuries to muscles and nerves resulting in a temporary paralysis so that reduction can be easily obtained. In simple fractures this paralysis is lacking, and active muscle pull quickly causes or exaggerates deformity and reduction is much more difficult to obtain. These types of fractures should, therefore, usually be treated along different lines.

There is, unfortunately, no single method of management that can be laid down as adapted to all cases of a certain type of fracture. This is, however, a method that experience has shown is adapted to most cases, and it is well to adopt such a method as a standard to be varied from only in special cases where the X-ray shows the desired reduction has not been obtained or where the general condition of the patient prohibits. Nearly every surgeon or institution has a more or less routine method of treating fractures which has grown up and been adapted from many sources. The adaptation of a routine method of treatment has the advantages of permitting the standardization of apparatus and materials, which can always be kept available, and of simplifying the training of personnel, so that they can render the maximum intelligent co-operation.

The method to be employed in the treatment of a fracture should be the one that will return the patient to work with a good functioning part in the shortest possible time. To do this the following must be observed:

1. Prompt reduction of the fracture.



2. Maintenance of reduction by proper splints.
3. Avoidance of unduly prolonged immobilization.
4. Support for weakened bone when function is first resumed.
5. Physiotherapeutic measures to hasten restoration of function.

#### REDUCTION

Of first importance in the treatment of simple fractures is good reduction. With the exception of fractures of the shaft of the femur and humerus treated by extension, reduction of all fractures must be obtained before splints are applied. An anesthetic is frequently required. In difficult cases reduction should be done under the fluoroscope. In some quarters the belief is prevalent that the putting of the elbow in the acute flexion of the Jones position, or the hip in the full abduction of the Whitman position, is all that is required in such fractures. On the contrary, reduction of these fractures must be obtained before the limbs are put up in these positions or poor results will follow. In all cases an X-ray should be taken after reduction and application of the splints to be sure that reduction has been obtained and is being maintained by the splints.

Good reduction is half the battle. Proper splinting and careful after-treatment can do little to repair the damage if good reduction has not been obtained. When union occurs in unreduced fractures an operation is usually required to repair the damage, particularly in the lower extremity. The abnormal strain on the ligaments and the secondary changes in knee, ankle and foot joints as a result of bowing deformities following fractures of the femur and unreduced Pott's fractures, are classical examples of bad results following failure to properly reduce.

#### FIXATION AND MANAGEMENT

Reduction having been accomplished, the method of management outlined under the special fractures listed below will be found useful:

*Colles fracture.*—Fixation by anterior and posterior board or molded plaster splints, with the wrist in slight palmar flexion and ulnar deviation, will be found most useful. Active and passive motion of the fingers should be insisted upon from the beginning. Massage and gentle passive motion of the wrist with splints removed can be begun on the tenth day, active motion on the twenty-first day, and splints can be discarded in favor of a wrist cuff after thirty days.

*Fractures of shaft of ulna and radius.*—Fracture of one or both

bones can best be immobilized by anterior and posterior molded plaster or metal splints. Wrist and elbow must both be immobilized, the former in dorsiflexion and the latter at 90° flexion. The position of the forearm should be full supination. Active and passive motion of the fingers should be practiced from the beginning. Begin massage at end of third week, removing anterior and posterior splints separately. Passive motion of wrist is started at the same time and elbow a week later. Rotation of forearm and active and passive motion of elbow and wrist should be begun in six weeks and splint discarded two weeks later.

*Fractures at elbow.*—Fractures into or near the elbow, with the single exception of fracture of the olecranon, should be put in full flexion and full supination by suspending from the neck, after the method of Robert Jones. After treatment: At the end of the third week loosen sling two inches and allow motion within this limit. Then lengthen the same amount every second or third day. If motion becomes painful tighten up again and rest for another week before allowing motion. Sling can usually be discarded in six to eight weeks and active measures instituted to regain full extension.

*Fracture of shaft of the humerus.*—Fix by internal and external splints. The best internal splint is formed by one side of a board triangle. The second side of the triangle rests against the chest and the base is directed downward. The apex fits in the axilla. This triangle is made to give about 30° abduction of the arm. The elbow is fixed in 90° flexion. The external splint is a molded plaster splint, immobilizing shoulder and elbow and extending down to the wrist. It is the so-called "elephant's ear" splint. The external splint can be removed daily for massage and gentle passive motion of the elbow after three weeks. Passive motion of shoulder can be started a week later. Splints are removed and a sling and arm cuff substituted in from six to eight weeks.

*Fracture of the surgical neck of the humerus.*—If good reduction is obtained treat in the same manner as for fracture of the shaft. If good reduction cannot be obtained treat in abduction on an aeroplane splint. After-treatment is the same as for fracture of the shaft. An excellent rule is to treat all fractures or injuries about the shoulder in abduction.

*Fracture of clavicle.*—Fixation to side by adhesive after the method of Sayre, combined with a Velpeau bandage for six weeks, gives as good results as any of the newer methods.

*Fractured spine.*—In the cervical region fix in extension by

well-molded and padded plaster collar, taking its bearing below on the shoulders and above from jaw, mastoid processes and external occipital protuberance. If there has been no cord injury the patient can be allowed to get about. For fracture of the dorsal and lumbar vertebrae treatment on a Bradford frame is recommended. Such a frame is provided with an opening for nursing purposes. The natural curves of the spine can be preserved and overextension obtained by bending the side bars. A pillow may be placed under the head and a ring under the pelvis. In addition a molded plaster shell improves the fixation of the back and, if desired, traction can be obtained by adhesive on both legs with elevation of the foot of the frame for counter traction. Fractures of the cervical region require fixation for eight weeks. In the dorsal and lumbar region the patient should be kept recumbent for ten weeks and then allowed about with a Taylor brace. In severe cases associated with cord injuries the patient should not be allowed up with brace for three months. All cases should be turned gently to the side daily and back rubbed with alcohol and then powdered. When ambulatory, baking, douching and massage with graduated active exercises are indicated. Cases with associated spinal cord injuries should never be catheterized but should be allowed to overflow. They should be watched for secondary deformities of the lower extremities, which, if noted in time, can be prevented.

*Fractured pelvis.*—In mild cases without displacement, strapping with rest in a fracture bed for six weeks and then ambulatory with sacro-iliac belt for two months, is all that is required. Severe cases should be handled on a Bradford frame along the same lines as that suggested for fractured spine.

*Fractured hip.*—Treat by Whitman's abduction method. The cast should be applied from nipple line to toes. In such a cast the patient can be turned. The head of the bed may also be elevated if required. Cut out front of cast over the knee cap in two weeks and institute passive motion. In two months cut the cast off below the knee and start massage and passive motion. The remainder of the cast is removed at end of the third month. The patient remains in bed for a month longer, receiving massage, passive motion and graduated active motion. The patient is then allowed to get about, wearing a walking caliper which is usually required for about six months.

*Fractured femur.*—Treatment by traction with the leg suspended in a Keller or Hogden splint in a Balkan frame is recommended. Skeletal traction by Ranshoff tongs or Steinmann pin, ap-

plied to femur just above the level of the adductor tubercle, is much superior to adhesive plaster. In the adult, start with 20 pounds' traction if the former method is employed and 30 pounds if using the latter. Reduce the amount if over-correction occurs. Frequent X-rays and measurement are required to maintain proper alignment. The limb should be suspended in fractures of the upper third with the hip abducted and flexed  $30^{\circ}$  and the knee flexed  $30^{\circ}$ . In fracture of the middle third put the hip in  $20^{\circ}$  abduction and flexion and the knee in  $20^{\circ}$  flexion. In fracture of the lower third the position of the hip is immaterial, but the knee must be flexed  $70^{\circ}$ . The tongs or pin are applied in front of the long axis of the femur in fractures of the lower third, in order to tilt the lower fragment forward. In this fracture reduction should be obtained before the traction is applied. If reduction cannot be obtained, immediate operation and open reduction are indicated, as the pressure of the lower fragment on blood vessels and nerves will cause disastrous results in a short time if not relieved. Treatment by the traction-suspension method allows easy access to the limb, and gentle massage and passive motion of patella, ankle and toes can be started at the end of the first week. If pin or tongs are employed, the surgeon can put the knee through a range of  $20^{\circ}$  daily, from the first. The pin or tongs should be removed in about thirty days. The patient should remain in bed for another thirty days with leg fastened in the splint. During this time massage, passive motion and graduated active motion are employed. At the end of this time the patient is allowed about wearing a walking caliper. The caliper is required for about four months.

*Fracture of shaft, tibia and fibula.*—Fixation is best obtained by plaster cast applied from mid-thigh to toes. If there is great swelling, elevation in a fracture box for a couple of days before applying the cast is advisable. The cast may be bivalved immediately—i. e., cut down the sides forming an anterior and posterior half, or this may be delayed for three weeks when massage is started. Motion of ankle and knee is started at the end of six weeks. The patient is allowed to walk on the leg, wearing a brace, at the end of eight weeks. The brace should be worn for three months.

*Pott's fracture.*—After reduction, put up in plaster cast from mid-thigh to toes with foot inverted and dorsiflexed. The use of fracture box and bivalving of cast applies to this fracture as well as to fractures of tibia and fibula. The after-treatment is also the same.

*Fracture of tarsus.*—Compression fractures should be molded

into shape after the method recommended by Cotton, taking care to restore the arch and preserving dorsiflexion at the ankle. They should be put up in plaster. The cast should not be disturbed for two months. During the last two weeks the patient should be instructed to walk on the foot in the cast. When the cast is removed an arch support and a high well-fitted shoe should be worn. Baking, massage, active and passive motion should also be started. The disability following such fractures is unfortunately great.

#### AFTER-TREATMENT

When every fracture is considered as being a potential deformity the importance of following fracture cases for some time after union has occurred is evident. The keynote of successful after-treatment is early function with support to prevent bowing of the soft callus. Use of the part by the patient himself is the best stimulus to bone growth and should be begun as early as possible. Before this can be permitted massage and passive motion can be utilized. In places where a physiotherapy department is not available, passive motion can be given daily by the surgeon on his rounds. Its purpose is to restore motion in the joints above and below the fracture. It should not be roughly given and need only be repeated a few times at a sitting. The purpose of massage is to stimulate the circulation. A nurse or attendant can be trained for this work. An electric light treatment for fifteen minutes followed by massage does much to preserve muscle tone and shorten convalescence. The use of a brace should be insisted upon until bony union is strong. For the upper extremity a plaster molded shell is all that is required. The best test of firm union is the disappearance of tenderness in the callus. X-ray is of value, but it must be remembered that X-ray will show lessened density and often the old fracture line for months after union is strong.

#### OPERATIVE TREATMENT OF FRACTURES

The indications for open operation are inability to reduce or to maintain reduction by closed methods. Certain fractures, such as fracture of the patella with tearing of the lateral expansions to such an extent that the leg cannot be voluntarily lifted from the bed without knee flexion, and fracture of the olecranon with separation of the fragments, are best treated routinely by operation. Certain other fractures, as fracture of both bones of the forearm, surgical neck of the humerus associated with dislocation of the shoulder, and fracture of lower third of the femur, very frequently require operation. With these exceptions the great majority of fractures can be

treated successfully without operation. In relation to operative treatment of fractures, the committee of the American Surgical Association (4) found that operative measures were not always successful and in such cases the end result was worse than if operation had not been attempted. They found that under 15 years the non-operative treatment was followed by excellent results so that in children open operation is rarely justified. Unless good operating facilities and a surgeon with some training in bone work are available, operation should not be attempted, as better results follow non-operative treatment. Except in fractures of the patella and olecranon, where it is permissible to wait a week or ten days, open reduction should be practiced as soon as it is evident that non-operative measures are ineffectual. Only under exceptional circumstances should non-absorbable materials be employed as internal fixative agents. The use of absorbable gut and autogenous bone give the best results.

#### SUMMARY

1. All fractures should be splinted before transportation. For this purpose, except under war conditions, coaptation splints, Thomas or Keller leg splint, and Cabot posterior wire splint, are the splints usually required.

2. Many compound fractures can be converted into simple fractures by prompt application of iodine and a sterile dressing. Where considerable laceration of the soft parts has occurred, debridement with primary or secondary closure should be practiced.

3. Infected compound fracture should be treated by Carrel-Dakin technique with suspension in Balkan frame and traction to preserve alignment.

4. Simple fractures and compound fractures present differences which require that they be handled differently.

5. Convalescence in fracture cases can be shortened and function conserved by employment of physiotherapeutic measures, early use of the part, and employment of braces and supports until callus becomes firm.

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## A BRIEF SUMMARY OF THE VITAL STATISTICS OF THE U. S. ARMY DURING THE WORLD WAR<sup>1</sup>

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AN UNUSUAL opportunity was presented to the medical profession of the United States to obtain data from the medical records assembled during the period of the World War for the study of the different phases of vital statistics relating to the young adult males in the United States under conditions which, though foreign to their normal environments, were yet uniform for them all.

*Strength of the Army.*—The total number of men who were in the United States Army (excluding the U. S. Navy and Marines) during the World War, from April 1, 1917, to December 31, 1919, inclusive, amounted to 4,122,930.<sup>2</sup> This number included all officers and enlisted men, both American and native troops. It also included all those who were either in the military service or enrolled in the organized National Guard on April 1, 1917, as well as all who volunteered for, or were inducted into, the military service in compliance with the Selective Service Act.

Of the total number of men who were in the military service during the period of the World War, 203,786 were officers, 3,524,400 white enlisted men, 360,716 negro enlisted men, 9,430 native Filipinos, 15,101 Porto Ricans, and 9,497 Hawaiians, including native Hawaiians and Orientals. The aggregate of the annual strengths of the Army for the period of the war, that is, from the approximate date of the declaration of war until the demobilization of the war army was practically completed, was 4,128,478. The aggregate strengths were: Officers, 206,382; white troops, 3,599,526; negro troops, 286,547; Filipinos, 18,576; Hawaiians, 5,615; and Porto Ricans, 11,832.

*Average Length of Service.*—From a comparison of the aggregate number of men who were in the military service and the aggregate annual strengths, we see that each man was in the military service approximately one year; each officer, a little more than a year; each white soldier slightly more than a year; each negro soldier, approximately 9.5 months;

<sup>1</sup> The information contained in this article was assembled by the author while employed in the Statistical Division of the Surgeon General's Office. Practically all of the basic information was obtained from the medical records which were furnished to the Surgeon General's Office from the various military hospitals. It is unfortunate that there are a number of statements of facts contained herein for which the method of arriving at them could not be given, since to do so would necessarily have resulted in unduly lengthening the article.

<sup>2</sup> Information obtained from the Second and Third (Final) Report of the Provost Marshal General's Office, to the Secretary of War, and from the Reports of the Adjutant General's Office.

each Filipino soldier, approximately two years; each Hawaiian soldier, approximately 7 months; and each Porto Rican about 9.5 months. There was then a sufficient number of officers and of each race of the enlisted men, and all of them were in the military service for a sufficient length of time, to furnish a fairly reliable index of how other men of the same races would react under similar conditions.

*Uniformity of Army Environments.*—The men who were in the United States Army, including both white and negro, were drawn from every section of the United States; and the native troops were also enrolled in the Philippine Islands, Hawaiian Islands, and in Porto Rico. The enlisted personnel, though largely confined to the age groups of 21 to 30, came from densely populated urban districts and sparsely settled mountain sections, from the farm and the factory, from clerical positions and from their occupation as laborers, and from every economic and social class.

Never before in the history of this country has such an opportunity presented itself to the medical profession for the study of the vital statistics of so many young adult males, not as affected by unequal environmental surroundings, the result of unequal economic factors, but under uniform conditions. The troops of all races were housed, clothed, fed, and officered with the same painstaking care. Consequently their relative susceptibility to infectious diseases was not influenced by extraneous economic circumstances.

Probably the best opportunity for such a study prior to the World War was for the United States Army during the Civil War.

*Civil War; Number of Men and Character of Medical Records.*—From the best estimates which are available, it appears that the total number of officers and men who were enrolled in the United States Army during that war amounted to 2,213,383 (1); and the aggregate annual strength for these men was approximately 3,500,000 (2); or in other words, each man, on an average, served in the Army about one and a half years' time. Unfortunately, however, for the study of the vital statistics of that period, the information in regard to the number of men who were received into the military service from time to time is vague (3). The character of the medical records which were in use, was also such as to render it difficult to obtain consecutive statistical data for the various cases. There was no practical way to determine from them how many of the cases which were treated in general hospitals originated either in the hospital personnel or among the patients while they were under treatment. Consequently it was necessary to omit all general hospital cases from the statistical tables; and although the deaths which occurred there were included, they were largely attributed



to the immediate cause of death, rather than to the primary cause of disease, which caused the first admission to hospital (3).

*Historical Comparison.*—In connection with the vital statistics for our army during the late war, it is of value and interest to consider such similar data as has been preserved for the various wars in which this country has been engaged, and also those for the years when we were not engaged in a major war.

Statistics have been preserved which show the admission and death rates for total diseases and injuries for practically every year since 1820, and in the majority of instances for certain selected diseases. It is apparent from these data that the death rate, for white troops, has decreased from an apparently nonepidemic annual rate for that period for diseases of 31.43 per 1,000 in 1823 (4) to a minimum of 2.27 in 1914, or a reduction of 92.4 per cent. During the same period the admission rate has decreased from an apparently nonepidemic rate of 1,868.89 (4) to 529.89 in 1913, or a decrease of 71.6 per cent.

Very frequently during the early part of this 100-year period the annual death rate was much above that mentioned. Thus in 1820 it was 63.30, 21.25 of which was due to scurvy; in 1821, 53.77, 14.27 of which was due to diarrhea and dysentery; in 1832, 64.83, 36.66 of which was due to cholera (4). A variation of 15, 20, 25, or 30 per 1,000 in a year in the death rate, as the result of an epidemic of some disease, was not unusual. These annual rates for the Army show what great advances have been made in preventive medicine, and not so much in our small army as in our country at large; for the health of the Army is only an index of the health of the civil community in which it is distributed and from which its personnel is drawn.

One of the most striking illustrations that can be offered of the advances in our preventive medicine is that regions which were formerly almost uninhabitable, on account of preventible epidemic diseases that were endemic in them, have been rendered practically as healthful as others which were normally much more so. Thus during the early years under consideration, the death rate for our troops stationed in certain parts of the southern sections of the country was frightful. At Baton Rouge, Louisiana, for the period from 1819 to 1824, inclusive, the annual death rate for our troops was 210 per 1,000; and for one year, 1822, the annual death rate was 260 per 1,000; or in other words, 26 men out of every 100 who were there for one year's time died as the result of disease. At this same post, 4,596 cases per 1,000 were under treatment in the course of each year's time for the above period. It consequently follows that every man must have been on the sick list once in every two months and nineteen days (4).

For the entire northern section of this country for the decade from 1829 through 1838, the annual admission rate was 2,660.12 per 1,000, and for the southern section, 3,080.47 (4). For the same section during the period of the World War, the annual admission rate for the northern one was 1,112.70, and for the southern, 1,271.57. The death rate for the northern section during the early decade was 19.60 per 1,000 per annum, and for the southern it was 45.52 (4); while during the World War in the northern one the death rate was 19.02, and in the southern, 15.01. If we deduct the deaths from the respiratory diseases, including influenza for both periods, the death rate for the northern division during the early decade will be 19.15 and for the southern, 43.44; while during the World War it would be 4.00 for the northern division, and 5.23 for the southern.

The success of sanitation in the prevention of diseases among the armies cannot, however, be measured as well by the morbidity and mortality rates for them in times of peace, when it is possible to safeguard the health of the men as well, and in modern times even better than in civil communities, as in time of war when large numbers of men must be hastily mobilized, and when they must operate in the field often with improvised sanitary appliances, where the thorough application of preventive sanitary measures is always difficult, and at times impossible to enforce.

During the Mexican War the annual death rate for white troops from disease was 100.46 (5); during the Civil War it was reduced to less than 75 per cent, or to 72.34 per 1,000 (6); for the Spanish-American War and Philippine Insurrection it was reduced to less than one-sixth of the rates for the Mexican War, or to 15.95 (7, 8); and in the World War it was still further reduced to 12.58.<sup>3</sup> Of this latter rate, 9.81 per 1,000 was due to the pandemic of respiratory diseases. If this excessive rate be deducted, the remaining rate would be 2.77. Again, if to this rate the death rate for the respiratory diseases<sup>4</sup> for 1914 be added, as an average for nonepidemic years, the annual rate would be 2.99, or only 0.72 per 1,000 per annum higher than the lowest death rate recorded for one hundred years; that is, 2.27 in 1914.

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<sup>3</sup>The majority of the rates for the period of the Civil War and Spanish-American War and Philippine Insurrection were calculated from the basic data obtained from Woodward and Smart, for the former war, and from the Surgeon General's Annual Reports and unpublished statistical tables which are on file in the Office of the Surgeon General, for the latter.

The period used for the Civil War is from May 1, 1861, through June 30, 1866, or from the beginning of the war until the demobilization of the war army was practically complete. In like manner the period used for the Spanish-American War and Philippine Insurrection was from May 1, 1898, through July 30, 1902, or from the beginning of the war with Spain until the Military Government was discontinued, which actually occurred on July 4, 1902.

<sup>4</sup>For diseases grouped in this article as "respiratory," see footnote, page 149.

The death toll for the United States Army, including officers and all enlisted men during the period of the Civil War, amounted to 359,528 (9); and if to this number the 200,000 deaths which, according to the estimate of Dr. Jones (10), occurred in the Confederate Army be added, the total number for our country amounted to approximately 560,000. The enormity of this loss which occurred in the total population of approximately 33,000,000 can be appreciated when it is compared with our loss of 114,109 during the late war, in a population of over 100,000,000.

While the data preserved in the statistics for the Civil War, (3) in regard to the disability cases, are too indefinite to warrant a comparison being made of such as resulted from that war with those for the World War, it would seem to be reasonable to suppose that the disabilities resulting from each of these wars were in proportion to the deaths.

*Factors Influencing the Development of Diseases.*—The various factors which influence the vital statistics of the Army should be carefully considered before arriving at definite conclusions. Thus the white and negro troops varied very materially in their respective susceptibility to diseases, and the susceptibility of each was materially influenced by a number of factors, some of which were:

1. Previous environment, as, for example, previous habitation in a densely populated urban district, or in a sparsely settled rural district.
2. Previous habitation in a healthy plateau region, or in a semi-tropical one exposed to the possibility of contraction of chronic infections, such as malarial and hookworm diseases.
3. Climatic conditions where the troops were trained.
4. The periods of the year with the attending climatic conditions.
5. The length of service with the possibility of the acquisition of relative or actual immunity as the result of military service.
6. The effect of age.
7. The effect of associated diseases.

The findings show that the native Filipinos, Hawaiians, and Porto Ricans were apparently much less susceptible to a number of infectious diseases than the white and negro troops. From closer examinations it is, however, apparent that in the majority of instances this apparent relative immunity was due more to climatic conditions; that is, to their living and serving in the tropical climates, with the attending open housing and free ventilation, rather than to their natural resistance.

Similarly, when comparing the statistics for the various wars, a number of factors must be considered before arriving at any definite conclusions. Thus it might be concluded from a hasty examination of the admission rates for venereal diseases that these diseases were more prevalent during the World War than during the Civil War, since the

rate for the enlisted men in the United States and Europe alone for the late war was 91.41 as compared with 84.26 for the Union troops during the earlier one. Further examinations show, however, that the admission rates for the whites from states other than the southern section<sup>5</sup> during the World War was 65.68, and for the southern states, 88.40; and that the negroes had a very high rate, 342.59, whereas, during the Civil War it was only 78.09. Thus the rate then for the whites from the same section actually showed a decrease, notwithstanding that more cases were brought to the attention of the medical authorities as the result of the physical inspections; and also that certainly such as were detected were recorded and reported more carefully.

Again it might be concluded from an examination of the rates for gastritis, enteritis and colitis, that this class of diseases had increased during the recent years. More careful examinations show, however, that this increase was more apparent than real, the apparent increase being due to the more accurate diagnoses, cases which were formerly reported as diarrhea and dysentery, now being returned under more definite diagnoses (in absence of acute infections) as gastritis, enteritis, and colitis.

It might also be inferred that typhoid fever was much more prevalent during the Spanish-American War and Philippine Insurrection (7, 8), than it was during the Civil War (6). Such may possibly be true. The admission rates certainly indicate that it was. There is, however, no way of determining how many of the cases which were reported as diarrhea, dysentery, and malarial fevers during the Civil War, were in reality typhoid fever. The combined admission rate for diarrhea, dysentery, and typhoid fever during the Civil War was 768.75, and during the Spanish-American War and Philippine Insurrection, 431.27; while the death rate for these diseases during the Civil War was 29.18, and during the Spanish-American War and Philippine Insurrection only 8.74.

#### REVIEW OF VITAL STATISTICS, WORLD WAR

*Admissions (cases).*—During the period of the World War the total number of soldiers in the United States Army, including all officers and enlisted men, both the American and native troops, who were excused from their military duty for one or more days, and reported to this office as sick, amounted to 4,075,487.<sup>6</sup> Of the total number of these cases of sickness, 3,515,464, or 86.27 per cent, were from diseases; 299,069, or 7.34 per cent, from injuries (exclusive of those received in

<sup>5</sup> For states grouped as composing the southern section, see footnote, page 150.

<sup>6</sup> This total includes a certain number of cases of more important diseases, such as venereal diseases which were recorded and reported, but not excused from duty.

battle); 224,260, or 5.50 per cent, from wounds received in action (including those in Russia and Siberia); and 36,694, or 0.90 per cent, for the soldiers who were killed in action.

Of the admission, for disease only, for the total army, influenza with 791,907 cases accounted for 22.53 per cent of the total, bronchitis with 255,148 cases for 7.26 per cent, and gonorrhea with 251,899 cases for 7.17 per cent.

For the enlisted men in the United States and Europe only the total respiratory diseases, including influenza, the pneumonias, and the common respiratory diseases,<sup>7</sup> amounted to 1,471,918 cases, or 41.87 per cent of the total. For these men the largest percentage of the cases of diseases for any one month was for October, 1918 (13.28 per cent), or the month of the maximum outbreak of the influenza epidemic. The preceding month, September, had the second highest percentage of the total (8.82 per cent), and the following month, November, the third highest (6.05 per cent), which was then followed by December (5.02 per cent). For the period of the influenza epidemic, including the last four months of 1918, the number of admissions for diseases of all kinds amounted to 33.17 per cent, or practically one-third of the total number of admissions from disease for the thirty-three months of the war period. During this same period 48.57 per cent of all the cases of the respiratory diseases which occurred were reported. This was the period when the maximum number of men were in the military service and when normally more cases would have occurred. The great preponderance of the cases of disease was, however, not due to the greater number of men, for the monthly rates based upon the actual strength for each month also far exceeded those for the other months. Thus for the troops in the United States the maximum annual admission rate per 1,000, in October, 1918, was 2,485.10, which was almost twice as high as that reported for any other month, with the exception of the corresponding rate for the preceding month, September, when it was 1,715.68. The maximum admission rate for disease in Europe was, however, not during the influenza outbreak in the autumn of 1918, but (excluding the abnormally high rates during the latter part of 1919 for the comparatively small army of the American Forces in Germany) in the preceding January (1,211.67).

Almost three-fourths of all of the cases of sickness which were reported for the troops in the United States, in Europe, and in other countries, were reported for the troops in the United States. Since the number of troops in the other countries was small, the percentage

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<sup>7</sup> For diseases classified for the purposes of this article under this heading, see footnote, page 149.

comparison of the cases for them with those for the larger bodies of troops in the United States and in Europe is of no significance.

The total admission rate for the period for the enlisted men in the United States was more than twice as high as that in Europe, it being 1,132.51 as compared with 548.85, the total number of cases in the two countries being 2,390,878 and 873,816. The system of reporting only hospital cases in Europe reduced the number of cases; but even after making due allowance for the difference in the method of reporting the sick, the very great difference in the number of cases of disease for the two bodies of troops is certainly significant of the excellent sanitary control of disease among the members of the American Expeditionary Forces.

That 2,000,000 men could be transported to a foreign country, and approximately 1,000,000 of them engage in active field operations against a military enemy, with very inadequate housing facilities for all of them, and that even in the presence of a world wide pandemic, that less than three men out of every five should require actual hospital treatment during the period of a year, is certainly satisfactory evidence of the efficiency of preventive medicine. Compare this rate, where each man was admitted to hospital once in twenty months, with that at Baton Rouge, La., for the period from 1819 to 1824, where each man was admitted to the sick list once in every two months and nineteen days, and the improvement can be realized.

*Deaths.*—The total number of deaths in the United States Army personnel that occurred during the War period amounted to 114,109.<sup>8</sup> Of this number 58,119, or 50.93 per cent, occurred as the result of disease; 5,591, or 4.90 per cent, as the result of ordinary injuries; 13,705, or 12.01 per cent, as the result of wounds received in action (including those in Russia and Siberia); and 36,694, or 32.16 per cent, were killed in action.

Influenza was the leading cause of deaths from disease for the total Army. This disease alone accounted for 24,664 deaths, or 42.44 per cent of the total from disease; lobar pneumonia and bronchopneumonia

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<sup>8</sup> All deaths are charged to the time and place of the occurrence of the original cause. It is the custom of the U. S. Census and of the various boards of health to charge each death to the time and place where it occurred rather than to the place of origin of the primary disease or injury. Since, however, the Army Vital Statistics are compiled for morbidity as well as for mortality, and since the plan adopted makes it possible to compute accurate case fatality rates, the plan adopted by us is believed to be preferable. The international rules for determining the causes of deaths are adhered to.

The statistics for the killed in action were obtained from the "Organizational List of the Members of the A. E. F., who died in service during the World War, which were compiled under the direction of the Adjutant General of the Army, Casualty Section, World War Division, Adjutant General's Office." These were kindly loaned to this office by the Office of the Adjutant General. Corrections are, however, being made in this list by that office and the final and correct tabulations for the number who were killed in action will be published by it.

stood second and third with a total of 19,167 deaths, or 32.97 per cent of the total. Including the common respiratory diseases, the total number of deaths from the respiratory group amounted to 45,037, or 77.49 per cent of the total. Of individual diseases measles stood number 4, with 2,370 deaths, or 4.08 per cent of the total; tuberculosis of the lungs fifth, with 2,240 deaths, or 3.85 per cent of the total; and cerebrospinal meningitis sixth, with 1,836 deaths, or 3.16 per cent of the total.

Of the total deaths from diseases, 33,998 occurred among the enlisted men in the United States, and 20,756 among the enlisted men in Europe, or a total of 54,754 for them in the two countries. The death rate for them in the United States was 16.10, as compared with 13.04 in Europe.

A very large percentage of the deaths for these troops occurred during the influenza period of 1918, the total for the last four months of 1918 being 67.31 per cent, or more than two-thirds of the total deaths from disease for the thirty-three months. Nor was this great preponderance in the deaths shown for this period due alone to a larger number of men being in the service at that time. This is shown by the fact that the death rate (100.98) for the troops in the United States in October, 1918, was more than seven times as high as that recorded for any other month of the period, with the exception for that of the preceding month, September (58.70). For the troops in Europe, while the death rate for October, 1918, did not exceed the death rate for the other months to the same extent, it was, however, three times as high as that for the American Forces in Germany in December, 1919 (16.32), which stood second.

Among the enlisted men in the two countries influenza and pneumonia caused 75.59 per cent or more than three-fourths of the total number of deaths. If we add to this percentage the percentage of the deaths from the common respiratory diseases, the total for the group amounts to 77.49. It is consequently difficult to exaggerate the relative importance of the respiratory diseases as the cause of deaths during the World War.

Of the total deaths from respiratory diseases, 78.86 per cent or practically four-fifths of them for the 33-month period occurred during the last four months of 1918, and nearly one-half, or 44.97 per cent, occurred from cases which were admitted to hospital in October, 1918, alone. Here, as elsewhere, all deaths are charged to the month of the original admission to hospital.

*Discharges for Disability.*—The total number of men who were reported to the Office of the Surgeon General as being discharged on certificate of disability as physically or mentally unfit for all further

military duty, amounted to 204,765.<sup>9</sup> Of this number of disabilities 169,039, or 82.55 per cent, were charged to diseases; 10,539, or 5.15 per cent, to ordinary injuries (excluding battle injuries); and 25,187, or 12.30 per cent, to the result of wounds received in action.

The leading cause of discharge from disability from diseases was tuberculosis of the lungs (21,682), which caused 12.83 per cent of the total; the second was mental deficiency (10,658), 6.30 per cent of the total; the third, pes planus (8,767), 5.19 per cent of the total; and the fourth, gonococcus infection (7,027), 4.16 per cent of the total.

Apparently a large number of these cases had the disability, for which they were discharged, when they volunteered for, or were inducted into, the military service. It is physically and mentally impossible to detect and exclude, by one single physical examination, all cases of physical disabilities which will cause military incapacity. That a large number of the disability cases did have the disease for which they were ultimately discharged when they volunteered for, or were inducted into, the military service is evidenced by the fact that, of the 142,887 discharges for the white enlisted men, 131,529 were discharged while still in the United States; and of the total number of 22,250 for the negro troops, 21,167 were likewise discharged while in the United States. In the great majority of these cases the men discharged did not see overseas service.

*Days Lost.*—The total amount of time lost as the result of diseases or injuries during the period of the war amounted to 86,956,323 days, which, reduced to men years, amounted to 238,237 men for one year's time; or, expressed in another way, approximately nine army divisions were absent from duty for an entire year's time on account of sickness or injury.<sup>10</sup> Of the total time lost, 62,681,428 days, or 72.10 per cent of the total, was charged to diseases; 6,773,376, or 7.79 per cent, to ordinary injuries; and 17,501,519, or 20.12 per cent, to wounds received in battle.

For diseases, the leading cause of the loss of time was influenza, which accounted for 10,676,172 days, or 17.03 per cent of the total from disease; gonorrhea stood second with 3,903,303 days, or 6.23 per

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<sup>9</sup> All discharges for disability are charged to the original time and place where the original disease, which resulted in the discharge, was first made of record in the military service. Due to the frequent transfer of patients from one hospital to another, this rule was necessary otherwise it would have been impossible to determine the percentage of the cases discharged, which originated at any particular time or place; viz., all cases which were discharged from cause which arose, or became apparent while our men were serving in France, would have been charged to the United States, since the discharges actually occurred in this country.

<sup>10</sup> All time lost was charged to the original time and place where the disease was first made of record in the military service. It is thus possible to compute accurately the loss of time for each particular class of cases, for each month and each year, and for each country.



cent of the total; and mumps was a close third with 3,884,147 days, or 6.20 per cent of the total.

For enlisted men the total amount of time lost from disease only in the United States and in Europe amounted to 58,757,802 days with a noneffective rate of 43.47. In other words, practically 43.5 men of each 1,000, who served in the United States and in Europe, were absent from duty every day during the period of the war on account of diseases only. This noneffective rate in the United States was higher than in Europe, it being 46.72 in the former country as compared with 39.16 in the latter, the total number of days lost in the United States for enlisted men amounting to 36,002,278 and in Europe to 22,755,524.

The total number of days that were lost for these enlisted men (from disease) in these two countries, with the greatest relative loss of time, occurred during the last four months of 1918, or during the influenza period; the total for the four months amounting to 34.90 per cent, or more than one-third of the total time lost for the 33 months.

#### INFECTIOUS AND SPECIAL DISEASES

*Respiratory Diseases.*—The total number of cases of respiratory diseases<sup>11</sup> reported amounted to 1,471,918, or 41.87 per cent of all cases of disease, which were reported from April 1, 1917, to December 31, 1919, inclusive. Influenza alone caused the admission of 791,907 cases, the two pneumonias of 78,346, and the common respiratory diseases of 601,665.

The number of deaths from this class of diseases amounted to 45,037, or 77.49 per cent of the total deaths from disease. Influenza caused 24,664 of the deaths; the two pneumonias, 19,167; and the common respiratory diseases, 1,206. The total annual death rate for the group was 10.91 per 1,000.

The total amount of time lost as a result of respiratory diseases amounted to 20,538,648 days, or 32.77 per cent of the total time lost from disease. Influenza alone caused the loss of 10,676,172 days, the two pneumonias of 3,079,023 days, and the common respiratory diseases of 6,783,453 days.

Considering the effect of race and country we find that the Porto Ricans had the highest admission rate for the respiratory diseases (500.77), which was approximately 20 per cent higher than that for the negro troops (398.52), who stood second; the white troops had the

<sup>11</sup> Includes influenza, lobar pneumonia and bronchopneumonia, and the diseases classed by us, for our convenience, as common respiratory, which includes: rhinitis, epistaxis, catarrhal nasopharyngitis, rhinoscleroma, vasomotor catarrh, acute catarrhal pharyngitis, acute catarrhal laryngitis, acute tonsillitis, chronic tonsillitis, bronchitis, suppurative pleurisy, serofibrinous pleurisy, fibrinous pleurisy, pleuritic adhesions, hemothorax, pneumothorax, and pyopneumothorax, and other diseases of the nasal fossae and of the respiratory system.

third highest rate (346.56), and the Filipino troops the lowest (211.97). The death rate for the Porto Ricans (7.09) was, however, much lower than that for the negroes (19.88), and also lower than that for the whites (9.81). This comparatively low death rate for the Porto Ricans was not due to racial resistance, but was the result of the mild climate in which they were serving. This effect of climate is also shown by the rates for the white troops who had a higher admission rate (252.49) in Panama than they did in Europe (213.97), but a death rate in Panama (0.56) only one-fourteenth as high as in Europe (7.87), and a case fatality (0.22 per cent) one-seventeenth as high in the former country as in the latter (3.79).

In like manner the negro troops, who had an admission rate in the Hawaiian Islands (160.56) that was more than 50 per cent as high as in Europe (297.05), had a death rate in the former country (1.50) less than one-tenth as high as in the latter (15.35), and a case fatality rate (0.94) less than one-fifth as high (5.15 per cent). Again, the Porto Ricans (1.42 per cent), the Hawaiians (0.91 per cent), and the Filipinos (1.75 per cent) all had higher fatality rates than the whites in the tropics, and also higher than any corresponding rate for the negroes, with the exception of that for them in Hawaii (0.94 per cent).

In summary of the effect of race and of section from which the troops were drawn upon the susceptibility to the pneumonias of the white and negro troops who were serving in the United States and Europe, the negroes from both the southern and other sections<sup>12</sup> showed a greater susceptibility to pneumonia, with a much higher death rate than the whites did. When, however, the rates for the negroes and the whites from the same sections are compared, the case fatality rate was approximately the same, although the fatality rate for the total whites is higher, due to the greater number of northern and western whites. In comparison of sections, both the southern whites and the southern negroes show greater susceptibility to the disease than did the corresponding northern groups with higher death rates, but with lower case fatality rates.

A review of the combined effect of previous habitation, location of the military camps, character of housing, and the condition of crowding, shows that the men from the southern states had the highest admission rates, but that it was those from the northern states, who were located in the northern camps and exposed to more severe or more inclement weather, who had higher death and fatality rates. The higher fatality

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<sup>12</sup> The states which were grouped for this purpose as the Southern Section are: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas and Virginia. All of the other states in the Union are grouped as the "Other Sections."

rates for the northern men were due, not to their environments prior to their entry into the Army, but to the fact that they were being trained in the northern section of the country. Thus of eight camps with a northern population, which stood in the fifteen camps with the highest fatality rates, six, or 75 per cent, of them were located in the northern section, whereas only two were in the southern section. Consequently it appears that the milder the climate the less fatal the respiratory disease.

Lobar pneumonia was reported as an associated disease in each 1,000 cases of the following acute infectious diseases: Paratyphoid fever, 43.48; influenza, 29.61; cerebrospinal meningitis, 26.02; acute miliary tuberculosis, 25.21; typhoid fever, 20.92; measles, 19.44; scarlet fever, 17.43; and German measles, 6.16. Thus this disease was reported in 10 more cases in each 1,000 cases of influenza than in the same number of measles.

Bronchopneumonia was reported as a complicating or intercurrent disease in each 1,000 of the following epidemic diseases: Influenza, 71.44; acute miliary tuberculosis, 71.43; measles, 47.67; typhoid fever, 44.73; cerebrospinal meningitis, 31.22; scarlet fever, 22.97; German measles, 6.22; and diphtheria, 5.85. Thus it occurred in 24 more cases of each 1,000 cases of influenza than in the same number of measles.

*Measles.*—There were 98,225 cases of measles reported during the period of the war, with 2,370 deaths, and the loss of time amounting to 1,877,944 days. The annual admission rate per 1,000 was 23.79; the death rate, 0.57; and the noneffective rate, 1.25. The disease stood No. 7 as the cause of admissions, No. 4 as the cause of deaths, and No. 7 as the cause of the loss of time. Lobar or bronchopneumonia was associated with it in 2,181, or 92 per cent, of the fatal cases.

The highest admission rate reported in one hundred years' time for the Army was in 1917 (82.06). The general tendency in the admission rates since the Civil War has been upward. The admission rate for the period of the World War was, however, lower than it was for the period of the Civil War (3), it being 25.28 for the World War as compared with 32.22 for the former one; while the death rate for the World War was only one-third as high as it was for the Civil War (0.63 and 2.02). The admission rate was also slightly lower than it was for the Spanish-American War and Philippine Insurrection (7, 8), it being 25.28 as compared with 26.06, but the death rate for the World War was twice as high (0.63 and 0.32). This latter fact was due to the operation of, and training for, the Spanish-American War being conducted largely in the tropics or in the summer season.

This marked influence of climate upon the fatality of this disease is

shown by the death rates for the troops in the tropics. Thus the Porto Ricans, who had the highest admission rate for this disease (92.54), which was almost four times as high as it was for the whites (25.01) and more than five times as high as that for the negroes (17.00), had a death rate (0.17) between one-third and one-fourth as high as the corresponding rate for the white troops (0.62), and a little less than half as high as that for the negro troops (0.40). Also no deaths were reported for the Hawaiians, who had the second highest admission rate (33.13 with 186 cases). This beneficial effect of climate is further evidenced by the comparative rates for the white troops, whose admission rate in Hawaii (10.46) was more than twice as high as Europe (5.12), while their death rate in Hawaii was lower than in Europe (0.19 and 0.22). Again, the admission rates for them both in the Philippine Islands (6.30) and in Panama (6.15) were higher than in Europe (5.12), and while no deaths occurred for them in either of the former two countries, the fatality rate in Europe was 4.22 per cent.

For the white and negro troops in the United States only, the whites had higher rates for admissions (40.98 and 27.71), for deaths (0.96 and 0.67), for non-effectives (2.10 and 1.65), and for discharges for disability (0.07 and 0.05); while the negroes had a higher fatality rate (2.40 per cent and 2.35 per cent), and a greater number of days lost per case (21.8 and 18.7).

Grouping the whites and the negroes into two groups (with reference only to those in the United States and Europe), one each for the southern states and one each for the other states, we find that the admission and death rates for the southern whites were more than three times as high as those for the southern negroes, and that the admission rate for the southern whites was practically four times as high as that for the other whites (66.87 and 16.53); whereas, that for the southern negroes was a little more than three times as high as that for the other negroes. The death rate for the southern whites was practically five times as high as that for the other whites, while that for the southern negroes was practically three times as high as that for the other negroes.

Comparing the rates for the whites, other than the southern, with those for the Union Army during the Civil War (3, 6), we find that there has been a very marked improvement, the admission rate for the Civil War being 30.41 and for the World War 16.53; while the death rate was 1.76 for the Civil War and only 0.38 for the World War. An even more marked lessened susceptibility is shown for the negro troops, since the admission rate for them was 46.86 for the Civil War, and only 17.55 during the World War; while their death rate during the former

war was 4.88, and during the last one it was less than one-tenth as high, or 0.43. It appears, then, that as the result of the change in environment, the susceptibility to this disease of the male adult negro of military age in this country has materially decreased in the last sixty years.

*Mumps.*—While only a few deaths and a few cases of permanent military disability were charged to mumps, yet the disease was one of great importance to the Army on account of the large amount of sickness and the great loss of time caused by it. The total number of cases reported was 230,356. It stood No. 4 in numerical frequency, being exceeded only by influenza, bronchitis, and gonorrhea. It was even more important as the cause of the loss of time, for which it stood third, being exceeded only by influenza and gonorrhea. The total number of days lost as the result of it amounted to 3,884,147, which, reduced to patient years, amounted to the loss of a full year's time for 10,641 men.

The highest admission rate recorded in 100 years was in 1918 (56.80). Since 1890 (7, 8) the admission rate for this disease has shown a rather constant tendency to increase, which has been especially marked since the Spanish-American War and Philippine Insurrection. The maximum admission rate recorded during the World War was in 1918 (56.80), which was materially higher than any annual admission rate recorded during the Spanish-American War and Philippine Insurrection, 15.24 (7, 8), or during the Civil War, 40.35 (3). For the entire period of the Civil War the admission rate was 25.46, for the Spanish-American War and Philippine Insurrection, 14.16 (7, 8), and for the World War 59.68.

Was this increased susceptibility shown during the World War over that for the Civil War, due to the inclusion, during the more recent war, of the southern troops and of a larger number of negro troops, or to other causes? We find that when the whites and negroes are each divided into two sections (with reference only to those in the United States and Europe), southern and other, the admission rate for the southern whites is practically three and a half times as high as that for the other whites, while that for the southern negroes was more than four times as high as that for the other negroes. The admission rate for the southern negroes was also much higher than that for the southern whites (176.50 and 126.18). The admission rate for the other whites during the World War was, however, almost twice as high as that for the whites of the Union Army during the Civil War (34.34 and 21.60); while that for the total negroes in the World War was more than twice as high as that for the negroes of the Civil War (139.82 and 66.75). It is apparent, then, that even after making due

allowance for the section from which the troops were drawn there were relatively many more cases of this disease during the late war than during that one sixty years previous.

The relative unimportance of this disease during the Spanish-American War and Philippine Insurrection can be attributed to the operations and training being largely conducted during the summer seasons or in the tropics.

In comparing the rates for the various races it is apparent that the negro is the most susceptible, their admission rate being in fact much more than twice as high as that for the whites, and far above that for the tropical troops. This apparent relative immunity of these tropical troops is probably to be attributed in part to climate rather than entirely to racial immunity; for while the admission rate for the negro troops in Europe was almost as high as that for them in the United States (122.72 as compared with 154.15), in the Philippine Islands it was less than one-tenth as high, and in the Hawaiian Islands approximately only one-fifth as high. The disease was also twice as frequent among the Filipinos in the Philippine Islands as among the negroes (27.13 and 14.59), but in the Hawaiian Islands the admission rate was more than four times as high for the negroes as for the Hawaiians (32.24 and 7.66). Few negro recruits were sent to either of these islands during the war, but of such as were sent, a greater number went to Hawaii.

Eleven per cent of all cases of mumps were complicated with orchitis (24,330 cases).

*Cerebrospinal Meningitis.*—Cerebrospinal meningitis, like mumps, was a disease of importance to the sanitary authorities of the Army, not as was the case with the latter disease, on account of the great number of cases, with the wide diffusion of the infection and of the great loss of time occasioned by it, but on account of the comparatively large number of deaths caused by it. Its case fatality rate (37.66 per cent) was the highest recorded for any of the acute infectious diseases. The total number of cases reported for the Army was 4,831, with 1,836 deaths. It ranked No. 6 as the cause of deaths, the deaths from it being 3.16 per cent of the total deaths reported from diseases.

Since epidemic meningitis was not reported to this office until the fiscal year beginning July 1, 1867, no exact comparison can be made of its occurrence during the Civil War (3). During the World War it occurred most frequently among the negro troops (1.84 per 1,000 per annum), next among the white troops (1.09), and least so among the Filipinos (0.05). It was also more fatal for the negro troops (45.44 per cent), if we exclude the one case with one death among the Filipinos and the two cases with two deaths among the Porto Ricans.

The apparent lack of susceptibility of the tropical troops is to be ascribed in a large part to climate rather than to racial immunity, for the disease was much less frequent among the white and negro troops in these islands than it was in the United States and Europe. Only one case was reported for the negroes in the Hawaiian Islands, and none in the Philippine Islands; while there were two cases for the whites in the Hawaiian Islands, none in the Philippine Islands, and only five in Panama, where the annual admission rate (0.25) was practically only one-fourth as high for them as it was in Europe (0.94), where it was lower in turn than in the United States (1.25).

If the whites and negroes (serving in the United States and Europe only) are divided into the two section groups, the southern states and the other states, and those for the same sections compared, the negro rates appear more favorable. That for the southern negroes was, however, higher than that for the southern whites (2.27 and 2.08), and the death rate for them was also higher (0.99 and 0.74). The admission rate for the southern whites was, however, much higher than that for the other whites (2.08 and 0.91), and the death rate was also much higher (0.74 and 0.32). The fatality rate for the southern negroes was quite high (43.72 per cent), as was also that for the southern whites (35.73 per cent). This latter group, however, had practically the same rate as the other whites (35.08 per cent). The highest fatality rate was recorded for the negroes from the other sections (51.52 per cent).

*German Measles.*—This disease was one of little importance to the Army, since comparatively few cases of sickness and few deaths were caused by it. It was largely of interest on account of the possibility of the confusion of the diagnosis of it with that of the more important diseases, measles and scarlet fever.

Only 17,378 cases with an annual admission rate of 4.21 per 1,000 were reported, while 82 deaths were attributed to it. Like measles, the admission rate was highest among the Porto Rican troops (21.72). The whites were second (4.50), followed by the Hawaiians (4.27), with the negroes last (0.90). No deaths occurred from it among the Porto Rican troops, and the average time lost per case was only 5.2 days. The negro troops, who had the lowest admission rate, lost the greatest amount of time per case (nineteen days), and also had the highest fatality rate (1.54). In the Philippine Islands the disease was much less frequent among the white troops than among the native Filipinos, while the greatest number of cases was reported there for the negroes. In the Hawaiian Islands it was also much less frequent

among the whites than among the native Hawaiians, and only one case was reported for the negroes.

This was one of the three diseases, the other two being scarlet fever and diphtheria, which occurred more frequently among the men from the states of the west, northwest, and central sections. Taking, however, the southern whites as a group, and comparing them with the other whites where the eastern whites are included, the admission rates for them were slightly higher (5.03 and 4.55). Relatively few cases occurred among the negroes, the rate being 0.97 for the southern negroes and 0.89 for the other negroes.

*Diphtheria.*—Diphtheria is a disease which received serious consideration by the sanitary authorities of the Army, not on account of the number of cases of it that occurred, or of the deaths that result from it, or the loss of time caused by it, but on account of the possibilities of the danger of it. Only 10,909 cases with an annual admission rate of 2.64 per 1,000 occurred; and there were only 177 deaths with a case fatality of 1.58 per cent. It did not rank among the 30 leading diseases as a cause of admission, but stood No. 19 as the cause of deaths.

The disease was not reported to the Office of the Surgeon General until July 1, 1862 (3). Even after making no allowance in computing the rates for the period of the Civil War, for the months when the disease was not reported, the annual admission rate for the period was still much higher than that it was during the late war (3.41 and 2.81), and the death rate was seven times as high (0.30 and 0.04). The fatality rate for the Civil War (all of which, as is well known, are very unreliable (3, 6), due to the reporting of deaths but not cases from general hospitals), was more than six times as high for the white troops as during the World War, 9.84 and 1.58 (3, 6). Since, however, this higher fatality rate is substantiated by the higher death rate, which was computed on an annual basis with the addition of the strength for the general hospitals, it is evident that the beneficial effect of the treatment with antitoxin or with other agents was very marked.

The admission and death rate for the white troops far exceeded that for any of the other color races, the admission rate being approximately three and a half times as high as that for the negroes (2.68 and 0.72), with a death rate twice as high (0.04 and 0.02). When the whites and negroes are divided (using only those in the United States and in Europe) into the two groups, one composed of those from the southern states, and the other of those from the other states, the admission rate for the southern whites is much higher than that for the southern negroes (1.36 and 0.83), but the admission rate for the other whites is more than twice as high as that for the southern whites (3.08 and 1.36).



As stated above, this was one of the three diseases to which the men of the west, northwest, and central sections seemed to be especially susceptible.

Even the other whites, however, had an admission rate, which was lower than that for the whites of the Union Army (3.08 and 3.27), while the death rate was one-sixth as high (0.05 and 0.30), and a fatality rate also one-sixth as high (1.62 per cent and 9.84 per cent). The greatest improvement, however, was shown for the negroes, their admission rate during the late war being 0.75 as compared with 4.25 during the Civil War; while their death rate, which was practically negligible during the World War (0.01), during the Civil War was much higher (0.32); and the fatality rate during the last war was also much lower (1.99 per cent and 7.86 per cent). During the late war the negroes had a much lower admission and death rate, with a slightly higher fatality rate than the whites; while during the Civil War they had a slightly higher admission and death rate, but a lower fatality rate.

Only one case of this disease occurred for the Filipino troops, one for the Hawaiian troops, with none for the Porto Ricans. This apparent immunity was probably climatic rather than racial, for no case occurred for the negro troops in either the Philippine or Hawaiian Islands; while there were only three for the white troops in the Philippine Islands. The whites, however, had 19 cases in Panama, with an annual admission rate of 0.97, which was lower than that for them in either the United States or Europe.

*Scarlet Fever.*—Scarlet fever, like diphtheria, was a disease that caused concern to the Army authorities during the late war, due to the possibilities of danger rather than from the actual damage done. It did not rank among the thirty leading diseases for admissions, deaths, and discharges for disability, and only No. 21 for the time lost. The total number of cases reported amounted to 11,675, with 354 deaths. The annual admission rate per 1,000 was 2.83, the death rate 0.09, and the fatality rate 3.02 per cent.

The disease has appeared in the statistical tables of this office since 1840 (5, 7). The highest admission rate recorded since that time for the white enlisted men was in 1917 (3.69), the second highest in 1845 (3.61), and the third in 1918 (3.41). Relatively more than ten times as many cases and three times as many deaths occurred as the result of it during the late war as during the Civil War, the annual admission rate being 3.02 as compared with 0.29 (3), and the death rate 0.09 as compared with 0.03. The disease was even less frequent during the

Spanish-American War and Philippine Island Insurrection (0.22) than during the Civil War, and the death rate was also lower (0.02).

This is one of the three diseases which, as stated above, occurred more frequently among the men from the west, northwest, and central sections. Grouping the whites and the negroes into the two groups (with reference only to those in the United States and Europe), we see that the rate for the other whites, including the eastern whites, was more than three times as high as that for the southern whites (3.55 and 1.20), while both rates were much higher than the corresponding rates for the negroes, it being 0.35 for the southern negroes and 0.38 for the other negroes.

If this admission rate for the other whites is compared with that for the whites of the Union Army, the greater susceptibility during the recent war is even more markedly shown, the admission rate for them being 3.55 during the World War as compared with only 0.26 during the Civil War (3). On the other hand, the rates for the negroes which were higher than those for the whites during the Civil War, when it was 0.65 (3) as compared with 0.26, showed a very material improvement during the World War, it being 0.36 for the total negroes in the United States and Europe. It is apparent, then, that, due to increased susceptibility, or to some other factor, the admission rate for the whites has increased, while that for the negroes has decreased. Possibly the increased prevalence among the whites may be due to more effective prevention among them during early life. One satisfactory feature, however, was that the fatality rate for the whites was much lower during the World War than during the Civil War (3.04 per cent as compared with 12.11 per cent); but on the other hand, the fatality rate for the negroes during the late war was slightly higher (2.08 per cent) than it was during the former one (1.69 per cent). But, as is well known, the fatality rates for the Civil War are unreliable.

Only one case of this disease occurred among the Filipino troops, one among the Hawaiians, and none among the Porto Ricans. There was also none among the negro troops in the Hawaiian or Philippine Islands. A few cases did occur, however, among the white troops in these islands and in Panama, although the admission rate in each group was much lower than in Europe, which was in turn less than one-third as high as it was in the United States. It is apparent, then, that even after making due allowance for the beneficial effect of the tropical climate, with its attendant increased ventilation and open housing, the whites showed greater susceptibility than any of the color races.

Over 3 per cent of the cases of scarlet fever were complicated with otitis media, and over 1 per cent with nephritis.

*Typhoid Fever.*—Typhoid fever has been separated from typhus fever in the statistical tables for the Army, since June 30, 1856 (7, 11). Prior to that time, the two diseases were reported under the one term of typhus fever. This is one disease, which as the result of sanitary measures, one of the most important of which is the use of the typhoid vaccine or prophylaxis, has practically disappeared from the Army. As is well known, it formerly, together with the dysenteries and diarrheas, with which the diagnosis of it was very often confused, was the scourge of armies.

Only 1,529 cases were reported during the period of the World War, with an annual admission rate of 0.37 per 1,000, or, expressed in terms of 100,000, 37 cases. There were only 227 deaths with an annual rate of 0.05, or 5 deaths in one year in 100,000 men. Fewer deaths per 1,000 occurred in 1918 from this disease among the troops in the United States Army, including those who were engaged in active field operations in Europe, numbering approximately 1,000,000, than among the adult males of approximately the same age who remained at home in the best sanitated area in this country—namely, in the New England States, New York, New Jersey, Michigan, and Indiana(12).

During the Civil War, even when making no allowance for the cases which were not reported or which were reported as diarrhea and dysentery or as malarial fevers, the annual admission rate was 34.65, and the death rate 11.81 per 1,000 (3, 6), as compared with the annual admission rate of 0.37 in the late war, for the white and negro troops combined who were serving in the United States and in Europe, and the death rate of 0.06. Unfortunately the admission rate during the Spanish-American War and Philippine Insurrection was much higher (51.89) than during the earlier war, but the death rate (5.66) (7, 8), was much lower. How much of this increase in the admission rate during the Spanish-American War and Philippine Insurrection was due to more accurate diagnosis is difficult to determine. The combined admission rate for typhoid fever, diarrhea and dysentery during the Civil War was 768.75 and the death rate 29.18, while during the Spanish-American War and Philippine Insurrection the admission rate was 431.27 and the death rate 8.74. The fatality rate for this group of diseases in the Civil War was 4.11 per cent (3, 6), and in the Spanish-American War and Philippine Insurrection 2.03 per cent (7, 8), and the World War 1.14 per cent.

During the World War, relatively speaking (using annual rates per 1,000), there was less than one case of typhoid fever to each 94 cases during the Civil War, and to each 140 during the Spanish-American War and Philippine Insurrection; and for deaths there was one death

during the World War for each 197 during the Civil War, and to each 94 during the Spanish-American War and Philippine Insurrection.

*Diarrhea and Dysentery.*—Two diseases with which the diagnosis of typhoid fever was often confused, diarrhea and dysentery, prior to and during the Civil War were a greater scourge to armies than even typhoid fever and extracted even a more dreadful death toll from our troops. Even during the Civil War they occurred with greater frequency and produced more sickness and mortality than any other form of disease (13).

Among the Union troops the total number of cases reported for the white and negro was 1,739,135 (13), with an annual admission rate of 734.10 and a death rate of 17.37. This admission rate was reduced to practically one-half and the death rate to less than one-fifth during the Spanish-American War and Philippine Insurrection, when the admission rate was 379.38 and the death rate 3.08 (7, 8).

During the World War, relatively speaking (annual rates per 1,000), there was less than one case to each 110 that occurred during the Civil War, and less than one death to 850. The actual admission rate for the white and negro troops in the United States and Europe during the World War was 6.63 and the death rate 0.02. The total number of cases reported for the two, for the white and negro troops, amounted to 24,546. The total number of deaths was only 81, as compared with 44,558 deaths during the Civil War and 1,474 during the Spanish-American War and Philippine Insurrection. It is evident that this class of diseases was satisfactorily controlled during the late war.

*Malarial Fevers.*—Another class of diseases that has practically disappeared from the United States Army as the result of active sanitation is malarial fevers. This class of diseases, like typhoid fever, diarrhea and dysentery, was formerly the scourge of armies when operating in certain localities, as well as of the civil communities (3, 6, 13). They formerly rendered certain sections of this country almost uninhabitable, where now, if the approved sanitary measures are enforced, they can be controlled.

During the Civil War they caused the admission to sick report of 1,385,253 men and the death of 15,470 men (3, 6). The annual admission rate was 584.93 and the death rate 6.03. The corresponding rate for the Spanish-American War and Philippine Insurrection was slightly higher (586.52), though the death rate (1.37) was much lower (7, 8). During the World War, relatively speaking (annual rates per 1,000), only one case occurred to practically every 190 which occurred during the Civil War, and one death to 600.

The army rates during 1919 again demonstrated, however, that the

price of exemption from this class of diseases is the proper enforcement of the approved sanitary measures, for as the result of diminished anti-malarial activities in the army posts and camps which remained in operation, the admission rates during the last months of 1919 were above the corresponding rates of 1918.

The experience of the Civil War was that, comparing only the troops which were operating in the same sections, the white soldiers were more susceptible to this class of diseases than the negro soldiers (3). This experience was substantiated by the army experience during the World War, for the total white admission rate was higher than the negro (3.53 and 3.00); also (with reference to the troops in the United States and Europe only) the rate for the southern whites was much higher than that for the southern negroes (10.05 and 3.02). The admission rate for the southern whites was more than seven times as high as that for the whites from the other sections of the country (10.05 and 1.45).

This was one of the classes of diseases where the Filipino and Porto Rican troops had high admission rates. In the Philippine Islands the admission rate for the Filipinos (45.38) was much higher than that for the whites (25.48), but slightly lower than that for the negroes (46.23). The rate for the Porto Ricans (50.72) was higher than any rate recorded other than that for the whites in Panama (88.34), where some of the Porto Ricans also served.

*Tuberculosis.*—The number of cases of tuberculosis of all forms which were reported was 38,607, with an annual admission rate of 9.35; the number of deaths was 2,766, with a rate of 0.67; the number of discharges was 22,812, with a rate of 5.52; and the days lost 3,775,935, with a noneffective rate of 2.51. Tuberculosis of the lungs alone stood fourth as the cause of the loss of time, and first as the cause of discharges for disability.

Owing to the variation in the efficiency of the physical examinations, it is difficult to determine the relative prevalence of this disease during the various wars. The rates as they stand, however, show that during the Civil War<sup>13</sup> the admission rate was 12.46 and the death rate 2.71 (3, 6) as compared with an admission rate of 4.45 during the Spanish-American War and Philippine Insurrection (7, 8), and a death rate of 0.68; and 9.73 during the World War for admissions, for the white and negro troops in the United States and Europe only, and 0.60 for deaths. One might infer from these data that the disease occurred less frequently in the Army, or was less prevalent in the civil population from which

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<sup>13</sup>Including consumption, scrofula, hemorrhage of the lungs, and other diseases of this class.

the soldiers were drawn, during the Spanish-American War and Philippine Insurrection than during the other two wars. The more obvious influences are, however, that the conducting of the training and of the military operations during the Spanish-American War and Philippine Insurrection during the summer or in the tropics, with the shorter period that the soldiers remained in the military service, and the less careful physical examinations during those wars than were required during the World War, both for the men while they were in the service and upon demobilization resulting in fewer cases being activated, and a smaller percentage of such cases as were present being detected,

The disease (with reference to the troops in the United States and Europe alone) occurred much more frequently among the southern whites than among the whites from the other sections of the country (12.97 and 8.32). If the whites from the other sections of the country are compared with the whites of the Union Army during the Civil War, but little difference is apparent in their admission rates (8.32 and 8.93). The rates for the negroes from both sections were higher than the corresponding rates for the whites, the admission rate for the southern negroes being to that for the southern whites as 17.59 is to 12.97, the death rate as 4.25 is to 0.56, and the fatality rate as 24.16 per cent is to 4.29 per cent. The admission rate for the total negroes during the Civil War was considerably higher than during the World War (21.14 and 15.71), the death rate was almost twice as high (6.79 and 3.58), and the fatality rate one-third higher (33.58 per cent and 22.76 per cent).

Comparing the color races, the highest admission rate was for the Hawaiians (20.13), the second for the Filipinos (16.53), the third for the negroes (14.97), the fourth for the Porto Ricans (9.80), and the lowest for the whites (8.90). In the tropical islands the admission rate for both the negro and white troops was much lower than the corresponding rate for the native troops, and lower than in the United States; also the rate for the negro troops was lower in the tropics than in Europe.

*Venereal Diseases.*—The venereal diseases during the World War, as during the previous wars, caused many admissions to sick report, much loss of time, and many discharges for disability. This class of diseases stood second as the cause of admission, being exceeded only by influenza; second as the cause of the loss of time, again being exceeded only by influenza; and third as the cause for permanent military disability, being exceeded by tuberculosis and mental deficiency. The total number of cases recorded was 357,969, the total number of discharges for disability was 10,450, and the total amount of time lost was 6,804,818

days. The loss of time reduced to patient years was equivalent to one year's time for approximately 18,643 men; or in other words, approximately two-thirds of one division at war strength was constantly incapacitated for duty as the result of them. Of the total number of cases reported, gonorrhea accounted for 251,899 cases; syphilis, 67,026; and chancroid, 39,044.

These diseases were recorded relatively more frequent during the World War (91.41) among the white and negro troops in the United States and Europe than during the Civil War (84.26), but less frequently than during the Spanish-American War and Philippine Insurrection (123.70). It is not to be inferred from the lower admission rate during the Civil War that the diseases were actually less frequent than among the civil communities or in the military service than they were during the World War. So far as is known, no physical inspections, such as were required to be held twice a month during the World War, were required during the Civil War (3). Again, the inclusion of the southern whites and the greater prevalence of these diseases among the negroes during the late war account for the increase in the combined rate. Thus the admission rate for the whites from the states other than the southern during the World War was 65.68, as compared with 82.03 during the Civil War, with 88.40 for the southern whites for the World War period. Also the admission rates for the southern negroes during the World War was practically four and a half times as high as that for the southern whites (397.72 and 88.40), and that for the other negroes was practically twice as high (191.67). Again, for the negroes in the United States and Europe the admission rate was much higher during the World War than during the Civil War (342.59 and 78.09).

We see from these data that whereas the whites, during the Civil War, had a higher admission rate than the negroes, during the World War the negro rate was practically five times as high. It appears, then, that as the result of the migration of a certain percentage of the negroes to cities away from rural communities the prevalence of venereal diseases among them has materially increased. Probably a part of this apparent increase was due to a certain number of cases being detected by the physical examinations, which were enforced during the World War.

These diseases for the total Army were most frequent among the negroes, next among the Porto Ricans, third among the whites, and least among the Filipinos. The highest admission rate for the whites was recorded in the Philippine Islands; the highest rate for the negroes in the United States; but the rate for the negro troops in the Philippine Islands (237.66) was almost seven times as high as that for the native Filipino troops (36.61), which difference is difficult to understand, even

after making allowance for the difference in the environmental conditions of the two races, as they serve in the Philippine Islands.

*Smallpox.*—Only 853 cases of smallpox, with 14 deaths, were reported for the total Army during the World War, with an admission rate of 0.21 and a death rate of 0.00; or, expressed in other words, 21 cases in 100,000 soldiers and less than one death in 200,000 soldiers. During the Civil War the admission rate for the white and negro troops combined was 8.00 (3, 6), and the death rate 2.75, while during the Spanish-American War and Philippine Insurrection it was 1.91 for admissions and 0.55 for deaths (7, 8).

*Smallpox and Typhoid Vaccination.*—The total number of men, including commissioned officers, who were vaccinated against smallpox amounted to over 4,000,000. As the result of this operation it was necessary to admit to sick report 20,333 men, or 4.93 per 1,000 per annum. Only one death was reported as having occurred as a result of this operation. The contributory cause of this death was bronchopneumonia. It occurred in November, 1918, during the influenza epidemic.

The same number of men were also vaccinated against typhoid fever. The admission rate for this operation was higher than that for the smallpox vaccination, it being 8.61 per 1,000 per annum, and the total number of cases 35,552. There was no death, however, charged to the typhoid vaccination.

*Otitis Media.*—Otitis media was reported as a complication or an intercurrent disease in each 1,000 cases of the following diseases: Measles (41.94), scarlet fever (32.44), cerebrospinal meningitis (21.68), influenza (4.67), German measles (8.62), diphtheria (5.85), and mumps (4.10).

#### FRACTURES

Of the 299,069 cases of external injuries, which resulted in the excuse of that number of soldiers from their military duty for one or more days, 39,569 or 13.23 per cent were fractures. There were 5,591 deaths from these injuries, 1,346 or 24.07 per cent of which were from fractures; 10,539 discharges for disability, 4,324 or 41.03 per cent of which were from fractures; and the loss of time amounted to 6,773,376 days, 2,480,591 or 36.63 per cent of which were from fractures.

Fractures, while they stood relatively low as compared with diseases for admissions (cases), ranked for death just below meningitis, which was No. 6 among diseases, the five diseases which caused more deaths than fractures being: influenza, lobar pneumonia, bronchopneumonia, measles, and tuberculosis of the lungs. For discharges for disability they ranked just below exophthalmic goiter, which was No. 10 among



the diseases. They were relatively much more important as the cause of the loss of time, standing just below bronchitis, which was No. 5 among diseases, the other four diseases being influenza, gonorrhea, mumps, and tuberculosis of the lungs.

#### BATTLE CASUALTIES

*General Summary.*—The total number of American soldiers (including all those in Russia and Siberia) who were wounded in action during the period of the World War amounted to 224,260; and in addition to this number there were 9,876 U. S. Marines<sup>14</sup> who were attached to the American Expeditionary Forces, wounded, or a grand total of 234,136.

The total number of United States soldiers killed in action amounted to 36,694; and in addition to this number there were 1,453 Marines killed, or a grand total for the American Expeditionary Forces of 38,147. The number of deaths which occurred as the result of wounds received in action was 13,705 for the United States Army, with an additional 1,011 for the U. S. Marines, or a total of 14,716. The total battle deaths, then, for the United States Army, including those for the U. S. Marine Corps who were serving with the American Expeditionary Forces, amounted to 52,863.

The total number of discharges as the result of wounds received in action, for the Army personnel only (excluding the Marines), amounted to 25,187. This number of discharges exceeded the number discharged for any one disease, the greatest number for any such being for tuberculosis of the lungs, 21,682.

The total amount of time lost by the Army personnel only (excluding the Marines), as the result of battle injuries, amounted to 17,491,844 days, which far exceeded the number lost for any one disease, it being in fact almost equal to the sum (18,463,622) of the three leading diseases; namely, influenza, gonorrhea, and mumps.

*Disposition of Wounded.*—Speaking now of the casualties for the United States Army alone, and excluding those in North Russia and Siberia, the number of wounded amounted to 224,089. Of this number 13,691, or 6.11 per cent, died in hospital. There were 51,813, or 23.12 per cent, who were returned to the United States for further treatment. There were returned to duty in France 158,585, or 70.77 per cent of the total. Of this number 70,175, or 31.3 per cent, left the hospital in 29 days or less, the average time of treatment for them being 14.7 days. Of the men who were wounded, 25,187, or 11.2 per cent, were ultimately discharged on certificate of disability. Of the total cases diagnosed as

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<sup>14</sup>The statistics for the U. S. Marines were very kindly furnished by the Headquarters of that Corps. (See footnote, page 146, reference to final publication of the number of members of the U. S. Army who were killed in action.)

fractures (25,272) 61.50 per cent were returned to the United States for further treatment.

*Military Agents.*—147,651, or 65.90 per cent, of the total wounds occurred as the result of gunshot injuries; 70,552, or 31.49 per cent, of poisonous gases; and 5,886, or 2.63 per cent, of the various other kinds of military agents. Of the total deaths from wounds 12,192, or 89.05 per cent, occurred as the result of gunshot missiles; 1,221, or 8.92 per cent, of poisonous gases; and 278, or 2.03 per cent, of other military agents. Of the total men discharged for disability 21,721, or 86.3 per cent, were wounded by gunshot missiles; 2,857, or 11.3 per cent, by poisonous gases; and 609, or 2.4 per cent, by other military agents.

*Wounds by Gases.*—The kind of gas was specified in 36,965 of the cases wounded by them; 4.99 per cent of these were caused by chlorine gas, 74.96 per cent by mustard gas, 18.49 per cent by phosgene gas, and 1.56 per cent by arsine. The fatality rate for chlorine was 0.38 per cent; mustard, 2.16 per cent; phosgene, 0.97 per cent; and arsine 0.52 per cent.

*Wounds by Gunshot Missiles.*—Of the total number of gunshot wounds where the missile was specified amounting to 72,768 cases, 28.06 per cent were caused by rifle ball, 23.97 per cent by shell, 46.44 per cent by shrapnel, 1.21 per cent by hand grenade, and 0.33 per cent by pistol ball. Of the total number of wounds received in action from cutting and piercing instruments and from gunshot missiles, only 0.26 per cent were from the former and 99.74 per cent from the gunshot missiles.

*Multiple Wounds.*—Among the men who were wounded during the World War by gunshot missiles, 42,023 received wounds in more than one region; and of those who died as the result of wounds received from gunshot missiles, 4,027 had received wounds involving two regions.

*Case Fatality.*—The case fatality from gas wounds was 1.70 per cent, from gunshot missiles 8.26 per cent, and from those produced by other military agents, 4.70 per cent.

The case fatality for the gunshot wounds during the Civil War was 13.60 per cent. As the excess in the fatality rates for the Civil War wounds over that for the World War wounds from gunshot missiles was 5.34 per cent, the actual saving of lives during the late war as compared with the previous war amounted to 7,888. The wounds of practically all of the important organs and extremities were attended with a lower fatality during the World War than during the Civil War. That from wounds of the small intestines was reduced from 80.40 to 73.73 per cent, for the stomach from 75.95 to 68.75 per cent, for the

femur from 52.44 to 24.94 per cent, for the bones of the head from 59.55 to 40.78 per cent, for the humerus from 20.78 to 10.17 per cent.

*Battle Fractures.*—Of the total number of deaths from gunshot missiles (12,192), 2,019 or 16.56 per cent were among fracture cases. The total loss of time from wounds received from gunshot missiles amounted to 14,444,536 days, and of this number 3,582,248 or 24.80 per cent were due to fractures. There were 3,850 fractures of the femur with 971 deaths, a fatality of 25.22 per cent; 4,069 of the humerus with 414 deaths, a fatality of 10.17 per cent; and 4,379 of the tibia with 615 deaths, a fatality of 14.04 per cent. The average time lost for each battle fracture of the femur that recovered was 326.9 days; for each compound fracture, not received in battle, 283.8 days; and for each simple fracture not received in battle, 184.4 days.

*Disabilities from Wounds.*—In 19,768 of the 25,187 men who were discharged for disability as the result of battle injuries, the character of the disability was catalogued; and in the other 5,419 the disability was shown either as an associated condition, or the reports received were too indefinite in character to warrant the classification of them. Definite disabilities were tabulated for the following percentages of wounds from gunshot missiles: Hand grenade 24.20 per cent, shell 22.04 per cent, rifle 18.30 per cent, shrapnel 15.44 per cent, other gunshot missiles 7.43 per cent. The total number, then, catalogued of wounds from gunshot missiles amounted to 12.47 per cent; and of those from gas, 3.62 per cent. Of 2,556 cases, the total number of definite disabilities from gas, 2,198 were cases of chronic bronchitis.

*By Arm of Service.*—The largest number of men wounded in action in any branch of the service was in the infantry (183,757), which had the highest rate (220.59). The largest number killed in action was also for the infantry (31,993), which again had the highest rate (38.41 per 1,000).

*By Day.*—The largest number of men wounded on any one day was on the 29th of September (8,358), the largest number killed being on the same day (2,048).

*By Regiment.*—The largest number of men wounded in any one regiment was in the 18th Infantry (5,090), which regiment also lost 819 men, who were killed in action, with a total for killed and wounded of 5,909. Of the men of this regiment who were wounded, 306 died, the total battle deaths for it amounting to 1,125.

*By Division.*—The greatest number wounded in any division was for the First Division (21,084); the largest number of killed in action also occurred for this division (3,634); the total number of killed and wounded for the division then amounted to 24,718.

*By Engagement.*—During the great offensive of the Meuse-Argonne, 105,157 American soldiers, including the Marines, were wounded, and 19,468 were killed in action, with a grand total for the killed and wounded of 124,625.

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# THE EMPLOYMENT OF ZIGZAG INCISIONS IN COVERING LARGE SCALP AND SKULL DEFECTS IN WAR SURGERY OF THE HEAD

By ADOLPH M. HANSON, M.D., Drs. HAESSLY, HANSON, AND TRAEGER  
*Faribault, Minnesota*

(With ten illustrations)

VARIOUS methods were used and devised in covering defects of the scalp and skull during the last great war. The tripod incision very well effected the covering of the largest number of defects due to gunshot wounds of the head. The closure of most of the larger defects was made possible by the three-legged or Isle of Man incision.<sup>1</sup> The tripod

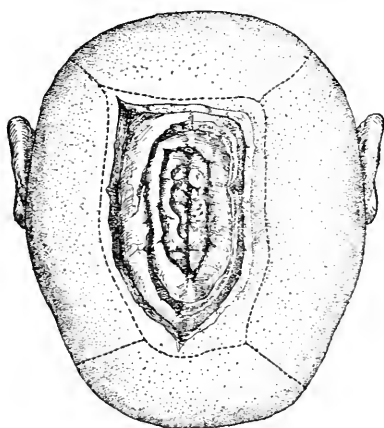


FIG. 1

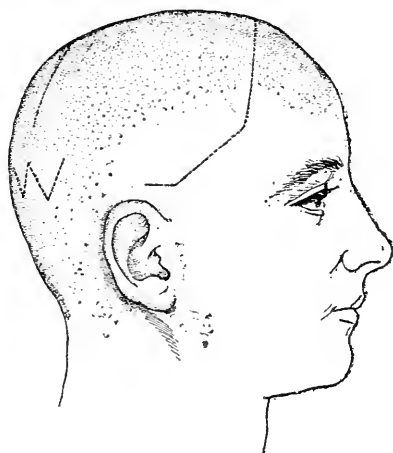


FIG. 2

incision was made by three straight incisions to the excised area in the scalp as a center. The angles that these incisions formed with one another and their individual lengths differed with the location and the size and general outline of the excised area. Three flaps of a triangular shape were formed by undermining them beneath the galea. The three-legged or Isle of Man incision was similar to the tripod incision, except that each leg was angled, i.e., each incision had a knee in it. These incisions were longer than those used in the former.

In most wounds and in all locations, the tripod and Isle of Man incisions were very satisfactory, in perforating as well as single penetrating wounds. Very large defects, especially those of the vault, could

<sup>1</sup>The Tripod and Isle of Man incisions were first described by Dr. Harvey Cushing in "Penetrating Wounds of the Brain," *The British Journal of Surgery*, London, February 23, 1913.

not be covered, however, by either of these methods. In this type, in order to bring up large flaps with a good blood supply and relieve all tension at the line of suture, it was necessary to make use of zigzag incisions. Figs. 1 to 8 illustrate the use of zigzag incisions in securing flaps to effect closure of a large defect of the vault.

The large scalp wound was first excised, and if a defect in the skull existed it was trimmed by the use of rongeurs. Defects of this kind usually had extensive depressed fractures. As a rule these were not disturbed, unless an attempt was made to control hemorrhage from a lacerated longitudinal sinus. This was done by placing peri-cranium,

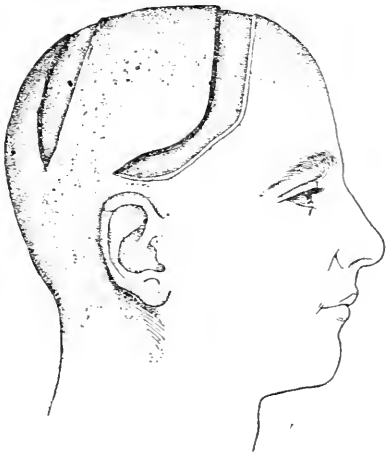


FIG. 3

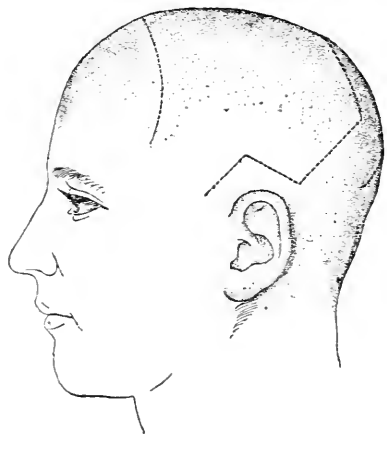


FIG. 4

turned outside in, over the rent in the sinus, or by ligation. If the sinus was ligated and a defect existed in the dura, the dural defect was filled in with a piece of fascia lata to which a thin layer of fat was allowed to remain attached, turning the fat side inward. Defects of the nature shown in Fig. 1, if due to the original wound, would be fatal, but are so shown for the sake of illustration. A defect in the dura on one side of the sinus might exist and a thrombus be formed in the sinus underneath bone fragments. When these were disturbed it usually caused a fresh hemorrhage, necessitating ligation with removal of the injured portion, making the dural defect larger.

A zigzag incision was made on the right side in front of the ear and a little above its attachment to the skull, the last leg extending above the ear. Similar incisions were made over the right occipital region. At the anterior end of the anterior incision, an incision was carried to the right anterior corner of the defect. From a point 1 inch above one

of the peaks of the posterior incision, a vertical one was made to the right posterior corner of the defect. On the left side, the anterior incision was made from the left anterior corner of the defect down to the

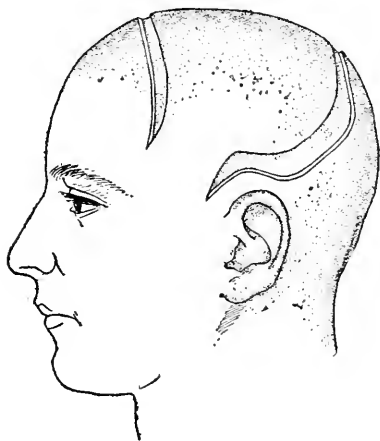


FIG. 5

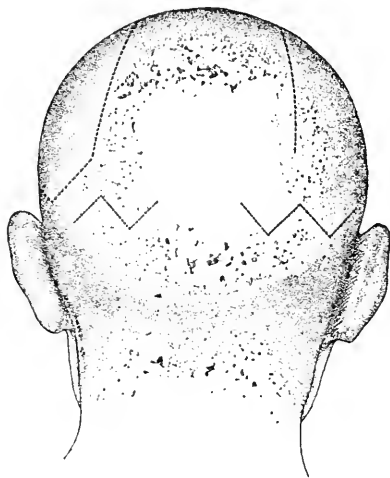


FIG. 6

zygoma, and a zigzag incision made behind the ear extending onto the lower occiput and carried up as a straight incision to the left posterior corner of the defect. Another short zigzag incision was made over the



FIG. 7

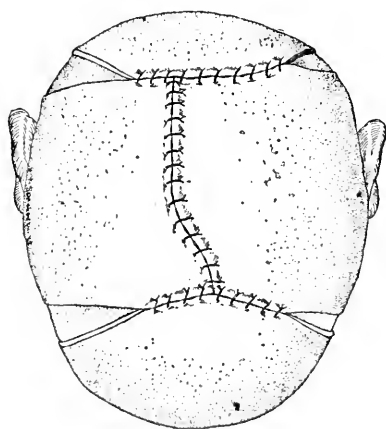


FIG. 8

left occiput. The two lateral and the posterior flaps were then undermined, and where the edges came in apposition without tension they were united by two layers of interrupted silk sutures. The right flap

could be brought up at both ends, with a little more slack anteriorly than posteriorly, and with its greatest limitation of stretch at the center. The left flap was liberal posteriorly, the amount of slack gradually lessening anteriorly. A certain amount of slack was obtained in the posterior flap by the short zigzag incisions over the lower occipital region.

When the possibility of closing the defect by this method was questioned, both sides were treated as that described for the left side, except that the position of the incisions on the right side were reversed. This gave a flap on the right side with its greatest slack anteriorly, and

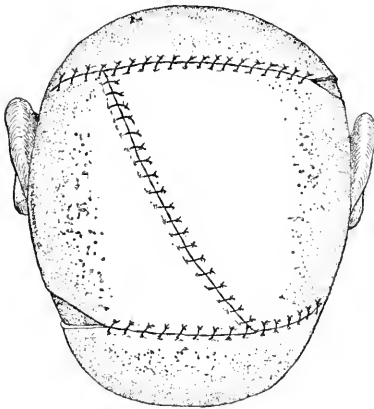


FIG. 9

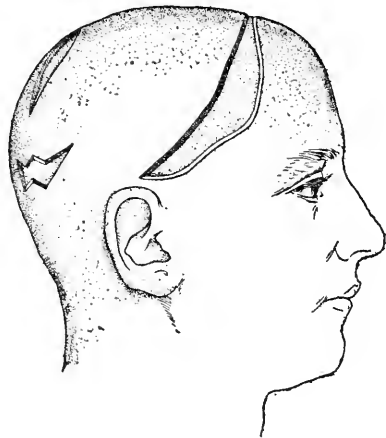


FIG. 10

that on the left side with its greatest slack posteriorly. If the defect is very large, this method is preferable to the former one, as a more effectual closing of the vault area can be accomplished. Fig. 9 illustrates the appearance of closure over the vault, and Fig. 10 the denuded areas on the right side of the head when the latter method was used. If necessary, short zigzag incisions could be made in the occipital region wherever the greatest slack was needed.

By these methods the defect was covered, leaving other portions of the intact skull denuded. In a remarkably short time, these flaps became adherent to the skull, so that, in cases where it later became necessary to insert a drain, it required a forceps and some force to establish a drainage opening beneath them for the insertion of rubber tissue. The defects over the intact skull were kept wet by dressings saturated with Dakin's solution.



## VIA VENERIS

By LIEUT. COLONEL H. H. RUTHERFORD

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"The expense of spirit in a waste of shame is lust in action"

IN SEX affairs man occupies positions all along the line from one to the other of the two moral extremes. His problem appears to be that of achieving, out of the confusion of ideas and practices, a correct and normal standard to which all shall adhere. The paramount preliminary of the solution of the problem is a clear conception of the factors underlying the sex situation. To contemplate these factors involves looking into the fundamental causes of man's natural conduct.

All man's activities depend originally and directly and in the following order of time on one or the other of the three instincts, self-preservation, self-exaltation, and self-procreation. The prime province of the existence of all beings has seemed to be that of perpetuating in kind. Hence the order of degree of the sway of the instincts has seemed to be, first, that of procreating; second, that of preserving self; and third, that of exalting self. The preserving self-instinct becomes manifest first, for the obvious reason that, if self is not preserved up to the point of adequate maturity, propagation cannot occur. The exalting self-instinct is explainable on the same basis—that is, the more powerful the individual the more possible for him to procreate. These instincts are cardinal and their effects as originators of the actions of man determine the nature of his physical, mental and moral make-up.

To the long and intricate story of the evolution of man's activities a substantial key is offered in the shape of one of his faculties—the first to come into play at the beginning of active cerebration. This faculty is defined as that of reacting to a stimuli. It signifies that for each experience of the animal organism there is a corresponding reaction, a physical sensation calling for more or for less of quantity and of quality. To exemplify, the delivered infant gasps and takes air into his lungs because external and internal conditions, acting coincidentally, effect a physical jar which provokes the instinct to preserve. This act, the first experience, results in a sensation of satisfaction to which the infant conscious being responds, calling for more (repetition) of like kind. Too frequent repetitions, producing a sensation of discomfort, cause him to slow down motion; too infrequent, producing another sensation of dis-

comfort, cause him to try more and less frequent spasms until one is found which, in point of frequency, produces the result that satisfies. The manifestation of a cardinal instinct results in action, which action affords pleasurable sensation, which pleasurable sensation calls for more of the act that more of the sensation may be forthcoming, and so on *ad infinitum* or *ad finem*. This is the Law of the Faculty of Stimuli Reaction upon which depends all the variations of man's natural activities—conduct.

The Law of the Faculty of Stimuli Reaction is seen to be, in a large measure, the factor responsible for what is termed as the prodigality of nature; but likewise it is at the back of conservation. Reaction to stimulus may be so modified by influences other than those of the primary physical sensation as to have its character changed from positive to negative, as in the case of the breath motions of the infant. By reasoning man can be diverted from a course which would result in immediate pleasure to a course quite the reverse in fact and effect. His reason tells him that by the latter course will result his ultimate and lasting pleasure and profit. Nevertheless, the law of the faculty of stimuli reaction still holds, the reaction as truly exists, but is diverted or reversed by judgment plus will power.

Will power is the force necessary to carry judgment into effect. Judgment is possible when, through experience, the intellect has become possessed of wisdom. Strength of will power is dependent upon the will's cultivation. In the case of each there is required to be on hand a modicum. In the case of the first, man must be possessed of intellect that he can acquire by learning sufficient knowledge that his wisdom will be such that he can depend on his reasoning to reach correct judgment. In the case of the second, he must and, in accordance with his degree of intelligence, does have at the start some measure of will power. (The infant has a germ of both intelligence and will power.) By exercise of will power is developed which normally keeps pace with the accumulation of wisdom and the ability of judgment. The concert of judgment and will power is known as the virtue prudence. It serves to curb the unbridled force of F. S. R. which later may be termed the essence of imprudence.

Prudence makes for conservation; imprudence for prodigality. In the case of prudence man is preserved, exalted and perpetuated. In the case of imprudence he becomes powerless, is degraded and extinguished as a race. In the case of prudence he develops an acute moral sense which he realizes with great persistency and to

which is given the name of Conscience. In the case of imprudence moral sense dwindles to a shadow and conscience is throttled perforce.

This is the way of sex affairs: The faculty of stimuli reaction in untempered action results in vice and prodigality. Judgment and will power in concerted action control F. S. R. and result in virtue and conservation. F. S. R. is inherent; judgment and will power are acquired by instruction and training. The solution of the sex problem is found in correct instruction and training.

There remains to demonstrate correct instruction and training. The assumption continence is the desideratum, the correct and normal standard, is admitted as a premise to the demonstration. This can be done for the reason instruction and training are not entirely defined by the matter of the subject taught; it is the form, the manner of carrying on the instruction and training, that signifies; it is by how rather than of what that teaching is made effective and learning acquired.

Furthermore, in that teaching which has for its object the ultimate training and conversion to do the thing taught, as is the case in this instance, there invariably enters for consideration the item of self-interest—profit. Men may have knowledge thrust upon them but they will not abide by its wisdom, certainly not as a rule, unless there be incentive—a sufficiently attractive profit. This logic here returns to the original foundation of man's conduct—the cardinal instincts and the law of F. S. R., also the conserving power of the concert of judgment and will. Continence will be possible of practice when its reward shall have been made a sufficiently obvious attractive one. The profit must not only be visible; it must be so overwhelmingly attractive as to overcome or reverse F. S. R. and induce the act of continence. In this particular case, moreover, the F. S. R. is supported by that chiefest of dominant instincts, procreation, the virtue of whose control custom has considered, like all merit, its own reward. Correct instruction and training then, in this case, is reduced to the matter of the appreciation of the practice of continence. But since continence is admitted, it follows that proper profit is conceded and no necessity to increase its present value, by added premiums or penalties, exists. Rather is it necessary to enlighten men sufficiently so that they will see and recognize and appreciate existing actual value. That this enlightenment can only come from broad, scientific, fundamental instruction and training of all mankind is manifest as a corollary of the way of sex affairs. Sex education that is thor-

oughly public and publicly thorough will demonstrate the superiority of the reward of the practice of continence and make it compellingly popular.

As can be seen, this species of education must aim at and deal with the modification and mitigation of man's most primal and deeply rooted characteristic, namely, that salient and strategic principle, secretiveness. To conceal and not to divulge, beyond a certain point, is the paramount human passion. Our ancient custom holds that personal privacy is man's first and last attribute, his inalienable and unimpeachable prerogative. How and why has this passion of privacy become so strongly fixed? What is the native human urge that forms its central scheme? Is it not that same combination of instincts which is both means and end in the game of life—perpetuation by propagation? Concealment, secretiveness, personal privacy, is the motive of the strategy by which man preserves, exalts and propagates himself. It is undoubtedly the true factor that forms the background foundation of the custom which has made taboo all things that have to do with sex.

Until this custom of taboo has been raised and has been supplanted by the freest and most open tolerance of publicity we cannot hope to reach the goal of that education we now know to be required.



Annual Meeting of the Association of Military Surgeons will be held at Washington, D. C., October 12, 13 and 14, 1922. Full Particulars Later.

## THE DEVELOPMENT OF THE VENEREAL BATTALION

By CHARLES M. WILLIAMS, M. D.

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IN THE notes that follow I have tried to show how the system of handling the venereal disease problem in the Army, by the segregation of all cases in a battalion organized for that particular purpose, grew out of the necessity of meeting conditions as they arose. It was not brought forth complete by the foresight or careful study of any man or group of men in the seclusion of an office, but was a gradual development, each improvement being introduced as occasion required. No attempt will be made to describe the methods of treatment followed nor even to give the details of the perfected organization. The problem had an entirely new aspect, also, for whereas in peace time no recruit with venereal disease had been accepted, such an infection was no longer a bar to service, unless, indeed, there were present contagious lesions of syphilis.

In the early days of Camp Meade, all the surgeons, including specialists assigned to the base hospital, were so busy examining recruits and taking regular sick call that no particular attention was paid to venereals as a class. After a week or two, however, it was possible to take stock of the situation. The base hospital was not yet in operation, the buildings were not even erected, so patients requiring bed treatment were sent to the Walter Reed Hospital at Washington. As this involved an ambulance trip of 20 miles, practically no venereals were so disposed of, especially as the hospital facilities were needed for other cases. The ambulatory cases were treated by the regimental surgeons and their assistants; some of these had had practical experience in the treatment of venereal disease, but the majority knew very little about it. No specialists had been assigned to the camp, and the few who had been sent to the base hospital were not available for regimental duty. There were no trained orderlies or nurses. Treatment was carried out at the regimental infirmaries or, in some cases where the number of venereals was unusually large, in a latrine building. The only instruments provided were glass penis syringes; the only drugs were protargol or its equivalent, silver nitrate, various mercurial tablets, blue ointment, and calomel ointment. One ingenious surgeon devised an irrigator by getting one of his men to solder a spout to the bottom of a galvanized iron bucket and then attaching a piece of rubber tubing with the barrel of a penis

syringe for a nozzle. In spite of the crudity of the treatment, the great majority of the men did very well: the gonorrheics gained more from the absence of alcohol than they lost by being kept on their feet, and I do not recall a single case in which the disease was aggravated. The syphilitics did well under rubbings or internal treatment; and some who had been rejected in accordance with the regulations of the War Department, on account of open lesions, were entirely free of their symptoms by the time their discharge papers were ready. After this experience, practically no venereal cases were rejected.

As a preliminary to any attempt to handle the situation, and as a basis for any comprehensive program, it was deemed advisable to secure an accurate record of all cases by name, organization and diagnosis. Each surgeon of an independent unit was therefore ordered to report each week to the office of the Division Surgeon the number of cases of gonorrhea, of syphilis, of chancroid, or of mixed infection in his command stating also the number in hospital or quarters and the number of cases of each discovered in that week, and infected after arrival in camp. It was foreseen that this last piece of information would prove to be of the utmost importance, but it was not called for by any of the "sick and wounded cards" or other forms issued by the War Department. About four months later we had repeated requests from Washington for figures showing the percentage of men infected on induction into service and the percentage of the command acquiring the infection after induction, and we had our answers ready. The data were analyzed in the office of the Division Surgeon and consolidated on special blank forms for the purpose. The forms were so planned that a small sheet showed the venereal status of each organization in camp, and of the camp as a whole at the time of the last report; and the same form could be used to show the record of each organization week by week. These blanks were prepared by mimeograph, using the regulation typewriter, partly to facilitate spacing and alignment when it came to filling them out on the machine, partly because there was no printing press available. These reports were prepared weekly, and the percentage of the entire command under treatment for each disease and the percentage of new infections in each class were plotted, so that we could show graphically any improvement or any falling off in sanitary conditions as regards venereal disease. The facts so obtained proved to be of enormous value, as indicating the extent of the problem and what was to be expected from new drafts. Our earli-

est statistics showed that about 4 per cent of white recruits might be expected to show visible evidence of venereal disease. The charts showed a sharp increase in the number of fresh infections after any holiday, like Thanksgiving and Christmas, when many of the men had leave; and later showed an increase when the previous strict orders forbidding all-night passes were relaxed.

So things went on for about six weeks, with gradual improvement in methods and equipment but no radical change. Even in this short time it became evident that comparatively few infections were acquired after arrival in camp, averaging six a week for the first few weeks for a population ranging from 20,000 to 30,000 men, and even this small number of fresh cases was gradually reduced later.

Then, in the early days of November, came a draft of about 5,000 negroes, and the situation became acute. These men were assigned to two regiments, one of infantry and one of field artillery, and the surgeons of these organizations were kept busy night and day making the physical examination which was required for all recruits on arrival at camp, filling out papers, and holding sick call. As usual with raw troops, the sick call was very heavy, 150 to 200 men a day per regiment being not uncommon. It was physically impossible for the surgeons to take any care of the venereals, and at least 15 per cent of the negroes showed active clinical signs of venereal disease.

The base hospital was about a mile and a half distant from the barracks of these regiments, over a road which was either sand or mud for a great part of the distance, so that it was not feasible to march the patients there for treatment, and they could not be admitted to the wards for lack of space. To meet the emergency, permission was obtained to use two latrine buildings as dispensaries. These were selected because they had running water and a sewage system, and there was not time to build or equip a dispensary even had it been possible to get authority to do so. Surgeons were borrowed from the base hospital and enlisted men from the Sanitary Train. Few of the surgeons and none of the enlisted men had had any experience in genito-urinary work. The only instruments available were two Valentine irrigators and some penis syringes; the only drugs were protargol or its equivalent, zinc sulphate, blue ointment, calomel ointment, bichloride tablets, and iodine.

On entering the building, the men were divided into two groups, those with a discharge and those with sores. A two-glass urine

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test was then performed on each of the former group and treatment ordered in accordance with the findings. The vast majority received only an injection of protargol as there was neither time nor facilities to do more. These injections were carried out by the men themselves under the direction of orderlies, the whole being supervised by a surgeon. The men with sores went to the other end of the building, where they were examined carefully and treated. The diagnosis was clinical; there were no facilities for making dark field examinations, and most of the cases were too early to show a positive Wassermann reaction. If the sore was a chancre, the man was put on inunctions at once, the rubbing being performed by the patient himself or by a fellow-patient under the eye of the surgeon. Local treatment was usually confined to soaking in bichloride solution and a dressing with plain gauze or with calomel ointment. Our task was to make the men fit for duty as quickly as possible, and everything had to bend to this one purpose.

In spite of the crudity of the treatment, the improvement of many of the patients was very rapid; any care was better than the neglect under which they had been living before. Some of the severe or complicated cases were sent to the base hospital, but at the first only a few could be so cared for. From the start, the greatest difficulty was in securing regular attendance; and the scheme was early adopted of preparing duplicate lists of venereal patients for each company and sending one copy to the company commander with the request that he order all men named to report to the dispensary under the command of a noncommissioned officer. The number of patients was so large that the dispensaries had to be kept open all day, and each company was, therefore, given a definite hour at which to report. The regimental officers were most cordial in their cooperation but often found it difficult or impossible to arrange the men's work so as to permit time for treatment, especially when 20 per cent or more of the command was on the venereal list, as was often the case. Many of the men also absented themselves from the group on the march from the barracks to the dispensary, or while waiting their turn, and it is probable that some evaded treatment even after admission to the building.

It is believed that these two stations were the first separate and distinct venereal dispensaries organized in the Army, and from them was developed the system of the segregation of venereal patients in separate battalions.

While this was going on, the treatment of all other venereal

cases in the camp was concentrated in two or three of the regimental infirmaries. This plan had several advantages. It made the supervision of treatment and of the records much simpler; it reduced the amount of equipment required at a time when equipment was very hard to get; and it put the actual care of the cases in the hands of a few surgeons who had some knowledge of the specialty. Even so, these stations were run with equipment secured from the Red Cross for several weeks before material could be secured from the Government, and there was always a dearth of competent urologists. There was no place for urologists in the divisional table of organization, so those whom we could find had to be assigned for regular duty with regiments where they did part of the routine work in addition to taking care of the venereals of several regiments. The plan would not have worked at all without the hearty cooperation of the regimental surgeons and, most of all, the cordial support of the Division Surgeon. This arrangement involved sending men with venereal disease away from their regiments for treatment and putting them under the care of another regiment. This was strictly unmilitary, so contrary to custom that no order was ever issued directing that it be done, and the scheme had to be kept going by mutual understanding.

Matters had reached this stage of development when the Depot Brigade began to assume increasing importance. Heretofore, recruits had been assigned at once to the various regiments; but after this they were all assigned to the Depot Brigade, and only transferred to the regiments after a period of two weeks or more. This led inevitably to the concentration of venereal patients in the Depot Brigade, as very few became infected after arrival in camp. The surgeons of the Depot Brigade had their hands full with examination and sick call, and none of the treatment stations previously established were within easy distance. To meet this situation, the first floor of a small barrack building was secured and equipped as a venereal dispensary. Later, the entire building was so used and, still later, one of the largest barracks in camp. The plans were drawn by the surgeon in charge; all labor was furnished by troops in camp; all supplies were obtained from the local quartermaster or from the supply depot; no requests were sent to Washington for anything. I believe the success of the scheme was very largely due to the fact that it was kept a local matter and managed on the spot.

Four surgeons were assigned to the Depot Brigade and detailed for special duty at this dispensary, and an enlisted personnel was

also detailed to it. This enabled us to give at least as good treatment as is ordinarily given in a city dispensary and much better than many of the patients, especially the negroes, had ever received before. In order to secure the full benefit of the organization, an order was obtained which classed all cases of gonorrhea and chancroid, and cases of syphilis with open lesions, as communicable diseases, the transfer of which from one organization to another was forbidden. This kept all the venereal recruits in the Depot Brigade until they were non-infectious and simplified enormously the management of the disease in the rest of the camp.

There was still great difficulty in securing regular attendance of patients and in regulating the amount of work they were expected to do, for in the Army a man is either fit for duty and may be ordered to perform any of the work that may fall to a soldier, or else he is on sick call and cannot be used at all. Most of the venereals would be benefited by moderate exercise and injured by severe work, and many of the company commanders cooperated willingly, but it is simply impossible to arrange the company work so as to suit both a sturdy soldier and a semi-invalid. We did not want these men in quarters, still less did we want them to fill up valuable space in a hospital, and at last the commanding officer of the Depot Brigade agreed to transfer all the venereals under his command to one battalion. They were then divided into three classes—those able to take light drill for an hour or two a day, those able to work half a day, and those on full duty, but with the understanding that nothing would be allowed to interfere with regular attendance for treatment. As far as possible the cases of syphilis and of gonorrhea were assigned to different companies in the battalion.

By this time we had a pretty clear idea of how many patients could be treated per hour, and a schedule was arranged so that the actual time lost from military duty by attendance at the dispensary was reduced to a very short period. The men reported in groups, under the command of a noncommissioned officer, who brought with him the company list to be checked up with the list at the dispensary. As the men had been placed in the venereal battalion for the express purpose of receiving treatment, it was much easier than it had been to secure attendance.

In spite of all precautions, we found that frequently men were transferred to other camps before cure; and investigation showed that in most of these cases the order for transfer came direct from Camp Headquarters in response to an order from Washington for

men with special qualifications, and papers for transfer were made out before the fact that the man was a venereal was discovered by those responsible for the transfer. To stop this leak, a special venereal file was made up in the card index at Camp Headquarters, and no man whose name appeared in this file was eligible for transfer. Names were added to this file as soon as a diagnosis was made, and removed when the man was pronounced non-infectious.

As a result of these measures, the number of men suffering from venereal disease in the rest of the camp was very small, but they were a nuisance to their organization and were not receiving so good treatment as the men in the Depot Brigade. At length an order was secured transferring all venereal cases, wherever found, to the Venereal Battalion of the Depot Brigade, and the system was complete. It was soon after this that the War Department authorized the formation of development battalions for the care of men who might be made serviceable soldiers after a few weeks or months of special treatment, and the Venereal Battalion found its place at once as part of the scheme.

Of the many problems that arose in the treatment of these patients, the most serious from first to last was the difficulty in securing regular attendance and treatment of all the men, for a certain proportion would absent themselves whenever possible and even evade treatment after being marched to the dispensary. The formation of a separate Venereal Battalion was the greatest single step in advance, but even with this help the greatest vigilance was necessary, with constant checking of lists and of attendance. Before I left, there were 2,000 men in the battalion; and, although many of these were syphilitics from whom daily visits were not required, still the average attendance was probably about 1,500. To handle such numbers, careful systematization is necessary. The scheme finally evolved is described in an article by Qualls and Meylackson in *THE MILITARY SURGEON*, January, 1919.

The prevention of new infections after arrival in camp was an entirely different problem, and before discussing it it is well to consider just what was required of army surgeons. Their task was to produce a healthy army in the shortest possible time and to maintain that army in health. They were not concerned, primarily, in the moral regeneration of the race, though their efforts all tended to that end. As the surest way to prevent venereal infection, the authorities at Camp Meade, therefore, laid the greatest stress on discipline, and, second, on prophylactic treatment. Passes to visit the neighboring cities were held down to a minimum, and

Organization		79th Division										1918					
		Commanding Officer															
		Surgeon															
1917																	
Week Ending	Oct. 20	Oct. 27	Nov. 3	Nov. 10	Nov. 17	Nov. 24	Dec. 1	Dec. 8	Dec. 15	Dec. 22	Dec. 29	Jan. 5	Jan. 12	Jan. 19	Jan. 26	Feb. 2	Feb. 9
Strength.....																	
Syph.—New.....																	
In Q. or H.....																	
Per cent.....																	
Total.....																	
Per cent.....																	
Gon.—New.....																	
In Q. or H.....																	
Per cent.....																	
Total.....																	
Per cent.....																	
Chancroid.—New.....																	
In Q. or H.....																	
Per cent.....																	
Total.....																	
Per cent.....																	
Mixed.—New.....																	
In Q. or H.....																	
Per cent.....																	
Total.....																	
Per cent.....																	
Total Ven.—New.....																	
In Q. or H.....																	
Per cent.....																	
Total.....																	
Per cent.....																	
Ven. Pro.....																	

Blank form arranged to show condition of organization from week to week.

Organization  
Commanding Officer  
Surgeon

Week Ending Jan. 19, 1918	313 Inf.	314 Inf.	315 Inf.	316 Inf.	310 F. A.	311 F. A.	312 F. A.	304 Eng.	310 MGB	311 MGB	312 MGB	304 Am. Tr.	304 Sup. Tr.	304 F.SIG. Bat.	Mid. Pol.	Hdq. Troop	304 San. Tr.	79th Division
Strength.....	2633	2410	2277	2432	1011	1025	1115	979	499	400	303	765	187	258	300	89	694	17,377
Syph.—New.....																		
In Q. or H.....	2.14	2.42	2.42		1			1					1				71	8.28
Per cent.....	.089	.089	.107	.018	.099			.102					.535				.103	.048
Total.....	10	14	8	6	12	3		3	3				1				4	64
Per cent.....	.38	.581	.351	.247	1.19	.293		.306	.601				.535				.576	.368
Gon.—New.....	2			1														
In Q. or H.....	3.71	3.71		.428														4
Per cent.....	.043	.154		.018														6.2
Total.....	19	23	39	34	24	22	6	31	5	2	3	10	3	2	1	1.12	14	.036
Per cent.....	.722	.954	1.71	1.4	2.37	2.15	.538	3.17	1	.5	.99	1.31	1.60	.775	.333	1.12	2.02	1.38
Chancroid New.....																		
In Q. or H.....						1		1										
Per cent.....						.098		.102										3
Total.....	3		2	1	1	1		1				1		1	.333			.017
Per cent.....		.124		.082	.099	.098		.102				.131		.388	.333			.063
Mixed—New.....																		
In Q. or H.....																		
Per cent.....																		
Total.....	1	3	3	2														
Per cent.....	.038	.124		.123	.198													
Total Ven.—New.....	2		1															
In Q. or H.....	1.145	.852	.42	.428	1		1	2					1				71	17.5
Per cent.....	.043	.242	.107	.018	.099			.204					.535				.103	.101
Total.....	30	43	45	39	26	26	6	35	8	2	5	11	4	3	1	1	19	326
Per cent.....	1.14	1.78	2.06	1.85	3.86	2.54	.538	3.58	1.6	.5	1.65	1.44	2.14	1.16	.667	1.12	2.74	1.88
Ven. Pro.....	8	4	25	9	3	15	12	6	3	4	2	9	0	0	0	0	16	116

Same form arranged to show condition of all subordinate organizations of the division at one time. This is a copy of the actual report. New cases, as shown in this report, are fresh infections acquired after arrival in camp and reported for the first time. Numbers shown on the line "In Q or H" represent the total number of Hospital or Quarters days divided by 7, in order to get an average for the week.

## VACCINATION AGAINST PNEUMONIA

By LIEUT. COLONEL P. C. FIELD

*Medical Corps, United States Army*

(With two charts)

THE following facts and figures relative to the use at Fort Myer, Va., of a protective vaccine against pneumonia, during the years 1921-22, are presented for the consideration of those interested in such a vaccine. Some camp or post surgeon, entertaining the idea of lowering the incidence of pneumonia and the various severe infections of the respiratory tract preceding the onset of pneumonia, may be aided by learning of the Fort Myer experience.

There are problems to be solved and antagonisms to be overcome at every station which has not been properly educated to the point of accepting such additional vaccination voluntarily. There is a natural disinclination to additional vaccination unless the particular individual has had a distressing experience with influenza or pneumonia or both. Not all take the viewpoint of the young field officer who, after a recent vaccination against smallpox and the triple typhoids, volunteered for the "pneumococcus vaccine" and then remarked, "I hope that I have now had so many dead bacteria injected into me that there will be no room for any live ones." Seldom are intrenched opposition and prejudice overcome except by preliminary strategical maneuvering, thereby developing the strong and weak points of the opposition. In other words, find out the reasons for the opposition and use preliminary education, discreetly applied, to properly prepare the individual or individuals who have to make the decision whether or not to volunteer.

Preliminary maneuvers at Fort Myer consisted of a primary frontal movement to post headquarters with the frank recommendation that alternate organizations be given the "pneumococcus vaccine" with the other organizations acting as "controls." We found the front and center strongly intrenched, properly dug in, and with reserves holding the position that such a vaccination would lower the morale of the command, and besides, "we are too busy at Fort Myer." After an orderly retreat from the front and center, and with only a few slightly wounded (able to walk), we held a consultation and agreed that only a flank attack was likely to succeed. We then tried a strong left flank attack on a squadron commander and were rather disastrously repulsed, aided by the use of much sulphurous fumes and smoke. It was planned as a surprise attack



without the aid of any preliminary bombardment of facts and figures. So we resorted to a rather disturbing short-range and intermittent barrage of facts, but avoided making the barrage heavy enough to produce a counter-attack to silence us. Next, our G-1 called upon our allies to start a long-range star (illuminating) shell on its journey to the rail head with the idea of disturbing the line of communication(s). This latter shell hit the mark unknown to us locally, at that time, hence we carried out a movement on the other flank before liaison was established between flanks, using all reserves and artillery at our command. The opposing artillery battalion commander proved to have been wounded by a former attack of pneumonia, and agreed to set an example and have his officers and men volunteer, always provided that first we succeed in taking the front and center.

This allied aid was our salvation, since the corps commander recommended that the post consider the proposition, his argument being the broad one of a duty to mankind and the world at large. This disturbance and break in the line of communication(s) lessened the resistance in front, and the letter acted as a flag of truce, bringing opposing sides together, less the opposing right flank. An honorable agreement was reached allowing the passage of our needle men, provided the rather isolated and opposing flank capitulated. This last resistance was then overcome with a scissors-like maneuver, using what may be termed the competitive tendencies of the average youth. The battalion commander showed much perspicacity in his method for obtaining volunteers. He had prepared for the chosen batteries a duty roster, with a typed heading containing a promise to volunteer. Then the selected batteries were paraded, the proposition explained to them, and volunteers requested to step two paces to the front.

In any group of men there are some who will try anything once, and these stepped forward, following quickly by the "also rans," and eventually by those who hate to stand alone. Next, these three types of volunteers were left faced and marched to the orderly room, where they signed up. A goodly number of volunteers were thus obtained, pledged to do or die and not to question why, including the Medical Department detachment.

Again the spirit of competition was invoked to change a very small number of volunteers from the irreconcilable right flank of sulphurous fame. The larger number of field artillery volunteers were paraded, "flags flying, bands playing," leaving it to the rest of the garrison to draw their own conclusions.

No true cavalryman will allow any blankety field artilleryman to do a stunt like that without going him one better, with the result that two batteries of field artillery and two troops of cavalry volunteered.

From the beginning it was quite an interesting game.

So the advice is given, that if you want volunteers, "make it a game," in which the natural competitive spirit is encouraged, and used.

When those who wavered at the doing made themselves known, their "John Hancock" in good black ink was disconcerting, and a strong incentive to the true American to finish the game once begun.

Those with religious scruples were, of course, excused without question, but not too many of American youths of this generation are ultrareligious.

The viewpoint of the soldier should not be forgotten, nor the fact that he is quickly influenced by a strong talking company growler.

Soldiers know anti-vivisection arguments, and often read newspaper articles directed against vaccination. The adaptable medical officer must be quick witted and possess ready answers based upon known facts or statistics. Any show of irritation produces a more determined and fixed opinion on the part of the doubting or wavering volunteer. The company commander is really the most important person to educate and persuade, although unable to aid if corps, post and battalion or squadron commanders are opposed. A good company commander will not ask his junior officers and his men to do anything which he is not entirely willing to do first. It is therefore wise to vaccinate the company officers first, and in the presence of the men, well knowing that "misery likes company." Allow the men to choose the site of injection, for if the medical officer insists upon the left arm, they may more easily follow a leader who prefers to have it below the axilla in order to avoid a sore arm. "Any old place, short of your eye" was what we told the location objectors, and they invariably chose the arm.

Neither at the January nor at the November inoculations were the vaccinated men relieved from any duty, and it was remarked that they were kept so busy at Fort Myer that no time remained in which to complain of sore arms or slight reactions. Of the 332 who completed the inoculation, beginning January 15 and ending February 10, 1921, there were no reactions recorded, and in the 378 completed cases in November, 1922, five moderate reactions were admitted to sick report. It is believed that admissions to sick

report for slight reactions ought to be avoided, otherwise these recorded reactions give an exaggerated and false impression and are seized upon by opponents as evidence of a real danger, causing the timid to escape from the second and third inoculations. It is not believed necessary or desirable to recommend that men be excused from duty for twenty-four hours after vaccination if the latter is given after 3:00 p. m. Vacations give time for excesses on pass and provoke more reactions, opposition and argument.

When the fall of 1921 arrived with an enlisted personnel at least 50 per cent new, by transfer from other regiments and the addition of recruits, no trouble arose from the proposed second vaccination within a year. The above-mentioned consistent and sulphurous right flank quickly volunteered to have his squadron act as the "control," and the battalion of field artillery volunteered as a unit to be vaccinated with the new vaccine, hoping for additional protection from the inclusion of *B. influenza* in the new vaccine.

A considerable number of volunteers from officers' families are recorded in the November vaccination list, also attracted by the hope for protection against influenza and "common colds."

A very severe test of the expected immunity from the new vaccine began to be noticed about February 10, 1922, with the appearance of cases of acute laryngitis and trachitis, with little involvement of nose, pharynx, or bronchi, but with moderate temperature and little or no prostration. The rapid increase of these cases, their irregularity and tendency to edema of mucous membranes of larynx, caused medical officers to take more cultures from nose and throat patients. The first laboratory reports from the Army Medical School were negative for Klebs-Loeffler, and haemolytic streptococcus, but it is only fair to state that we did not urge the finding of *B. influenza*. That an unusual infection had appeared on the post was very evident, and the disease spread through the barracks of both controls and the vaccinated, and also through the officers' quarters. Those portions of the post personnel spending most of the day working out of doors, such as the Motor Transport Section of the Q. M. Corps, and the prisoners were distinctly less affected. After twenty-four hours, fever developed in a large proportion of the cases, and the station hospital capacity of seventy-five beds was taxed to its utmost. Cooperation of the line officers aided greatly in frequent checks on ventilation, with controlled heat of barracks, properly dubbed shoes, sufficient blankets, greater protection of those on guard duty, and prompt escort to hospital

of every man showing signs of illness or a "cold." All cases were placed in cubicles and every effort made to limit cross infections.

Fort Myer is fortunate in having the aid of the Army Medical School, and a galaxy of specialists took interest in the outbreak and, after a survey of patients in hospital, prepared their own specimens for study in their laboratories.

For the sole benefit of our more scientific friends we will give

### PLATE I

INCIDENCE OF RESPIRATORY DISEASES PRE-INOCULATION PERIOD (ENTIRE POST-1191-)		INCIDENCE OF RESPIRATORY DISEASES POST-INOCULATION PERIOD (ENTIRE POST-1193)	
NOV. 1/20 TO FEB 15/21		FEB. 15/21 TO MAY 25/21	
TONSILLITIS	31	TONSILLITIS	25
BRONCHITIS	19	BRONCHITIS	29
PHARYNGITIS	3	PHARYNGITIS	1
LARYNGITIS	1	LARYNGITIS	1
PLEURISY	1	PLEURISY	1
PNEUMONIA	1	PNEUMONIA	2
TOTAL CASES 57		TOTAL CASES 59	
CONTINUED IMMUNITY PERIOD (JAN. 1921 TO OCT. 1921) (IN VACCINATED AND CONTROL GROUPS)			
VACCINATED NONE OCCURRED			
CONTROLS			
TONSILLITIS	3		
BRONCHITIS	3		
OTITIS MEDIA	3		
TOTAL CASES 9			

Section A—Before January inoculation.

Section B—After January inoculation.

Section C—Period of Changing Conditions and Personnel.

statistics and state that, to our best knowledge and belief, said statistics are not colored to meet our personnel opinions or those of our laboratory friends.

The organizations acting as "controls" and those vaccinated lived under very similar conditions as regards type and sanitation of barracks and amount and kind of exposure during duty. Statistics given in this report (Plate II) will be confined to these organizations living under similar conditions in order that con-

clusions may be more accurate. The January, 1921, vaccination is of much less scientific value than the November one.

*The First Vaccination.*—The vaccine used in January, 1921, was known as the "Pneumococcus Vaccine," each c.c. of which contained 1,333 million each of types I, II, and III. The method of inoculation was  $\frac{1}{2}$  c.c. on first day followed by two inoculations of one c.c. each at weekly intervals thereafter. Acute "colds" or sore throats with an accompanying fever were contraindications to vaccine ad-

## PLATE II

"PNEUMOCOCCUS VACCINE" USED JANUARY 1921 INOCULATION	POST-INOCULATION PERIOD FEB. 15/21 TO MAY 23/21		JANUARY VACCINATION	
	VACCINATED 302		CONTROLS 444	
TONSILLITIS	6		5	
BRONCHITIS	2		8	
PHARYNGITIS	0		0	
LARYNGITIS	0		1	
PLEURISY	0		0	
PNEUMONIA	0		0	
	<b>TOTAL CASES 8</b>		<b>TOTAL CASES 14</b>	

"PNEUMONIA VACCINE" USED NOVEMBER 1921 INOCULATION	POST-INOCULATION PERIOD NOV. 15/21 TO MARCH 29/22		NOVEMBER VACCINATION	
	VACCINATED 371		CONTROLS 473	
TONSILLITIS	8		6	
BRONCHITIS	9		10	
INFLUENZA	20		43	
PHARYNGITIS	0		2	
LARYNGITIS	0		0	
PLEURISY	0		0	
DIPHTHERIA	0		1	
PNEUMONIA	0		0	
	<b>TOTAL CASES 37</b>		<b>TOTAL CASES 62</b>	

ministration. Because of the lack of personnel, the taking of temperatures, examination of teeth and throats and the taking of nose and throat cultures, in enlisted men, prior to each inoculation, could not be undertaken in the January vaccination. The word "recruit," as used in this report, refers to individuals with service of four months or less in this enlistment. From September, 1920, to February, 1921, inclusive, 129 recruits are included in the vaccinated and control personnel and were about equally distributed, only 13 more enlistments being made from February to July. In this relation it should be noted that vaccinations were completed February 10, in the absences of the January inoculation.

Additions to post personnel by transfers from other stations, for the six-month period prior to the January, 1921, inoculation, were too small to be of importance. For purposes of comparison it is well to state that we have fixed the winter season at Fort Myer, Va., between the dates of November 1 and March 20. The coldly scientific observers regretted that the winter of 1920-21 did not really begin until January, and spring weather had arrived by March 15, the winter season being mild and not "pneumonia weather."

It has been agreed upon that, for the January, 1921, inoculation comparison, the "*pre-inoculation*" period will be from November 1, 1920, to February 15, 1921 ( $3\frac{1}{2}$  months), remembering that inoculations took place in January with completion of absentees February 10, and the "*post-inoculation*" period will be from February 10 to May 25, 1921, or  $3\frac{1}{2}$  months.

In the above *pre-inoculation* period of  $3\frac{1}{2}$  months there were admitted to hospital, 1 case of lobar pneumonia, 31 of follicular tonsillitis, 19 of bronchitis, 3 of pharyngitis, 1 of laryngitis, and 1 of pleurisy in a total garrison strength averaging 1,191, and of the above cases there were only two recruits with tonsillitis. (Plate I, Sec. A.) These figures are presented to show the amount (53.74, annual rate per 1,000) of respiratory diseases existing in the whole military personnel of this garrison prior to the first pneumococcus vaccination. During the  $3\frac{1}{2}$  months subsequent to the completed vaccinations, there were in the whole post 2 cases of pneumonia, 25 of follicular tonsillitis, 29 of bronchitis, 1 of pharyngitis, 1 of laryngitis, and 1 of pleurisy. (Plate I.) These figures, for the whole garrison of about 1,200 officers and men, are presented in order to establish the fact that severe respiratory infections did exist at Fort Myer, and that the three pneumonia cases were of the migrating and fatal type.

The figures given in Plate II (post-inoculation period) are confined to the three batteries of field artillery and four troops of cavalry, living in similar barracks under identical sanitary conditions, and performing the same type of duty, which, it has been previously stated, would constitute the "vaccinated" and "control" groups, not considering the 31 others who were inoculated but living and working under varied conditions. There were also 28 men at the January vaccination, and 39 in November who did not complete the inoculations, and these are included in the controls. The reader may draw his own conclusions regarding the result of the January vaccination from Plate II, Sec. A, considering that of

the total (333) vaccinated during January, 1921, in a garrison of 1,191, 302 vaccinations were in the cavalry and field artillery as compared to 444 "controls" in the cavalry and field artillery. Two cases of tonsillitis and one of laryngitis were among recruits.

We at Fort Myer, and the editorial "we" includes the "men behind the guns," decided that there was a distinct protection from pneumonia and the diseases known as "common colds," which includes tonsillitis, pharyngitis, laryngitis, and bronchitis as well as rhinitis. We believe that it is a "2 to 1 shot" that vaccinations will protect under ordinary conditions of exposure and ordinary contact with respiratory disease germs. This agrees with the opinion of many military and civilian volunteers in Washington, D. C., who were the first to accept vaccination at the Army Medical School in previous years. That the "men behind the guns" believed it, was proven by the lack of any necessity for a call for volunteers at the November inoculation. They proposed revaccination for the winter season 1921-22 before any medical enthusiasts had broached the subject, since they had been informed that the immunity probably lasted for a few months only.

Plate I, Sec. C, has been prepared for the edification of those who may inquire as to the apparent extent of the immunity. This plate should be considered with the knowledge that about one-half of the "vaccinated" and one-half of the "controls" were under quite different conditions of exposure, climate and duty, from May to October, 1921.

The "vaccinated" and "controls" of the field artillery marched, in June, 1921, 165 miles to the Pennsylvania National Guard target range at Tobyhanna, Pa., staying in this cool mountainous region quartered in temporary wooden barracks until September, when they marched back to Fort Myer. The cavalry, "vaccinated" and "controls," stayed at this post except for a two-weeks tour of duty at the District of Columbia National Guard target range where they lived in wooden barracks. One recruit with tonsillitis is included in Plate I, Sec. C. In this plate the figures are even more favorable for the "vaccinated," indicating at least an eight-month immunity for each vaccination. Further comment on the small and hastily conducted January inoculation is superfluous.

*The Second Vaccination.*—We now take greater pleasure in presenting observations on the November vaccination, having had the aid of the agitators of the pneumococcus vaccination and the guidance which goes with the appointment of a local medical officer to take entire charge of all statistics and formal reports, and who

acted as a liaison officer with the Army Medical School. A weekly visit has been made by a courteous representative of the Army Medical School who has endeavored to keep before us the importance of detailed observation. The scientific gentlemen who regretted the lack of pneumonia weather during the winter of 1920-21 were interested when a short and sharp outbreak of influenza occurred in February, 1922, thus testing the new vaccine, which included one strain of *B. influenza* (the "Rivers No. 1 strain" obtained from Johns Hopkins Hospital). The influence of this influenza outbreak should be kept in mind when comparing the figures of the November inoculation with the previous one of January.

Conditions affecting the recruited and transferred personnel were different for the November inoculation, in that there were 172 men transferred to the cavalry "control group" from the Panama Canal Zone, and 238 from Camp Meade, Md., to the field artillery "vaccinated" group. In addition 64 recruits were assigned to the battalion of field artillery which constituted the vaccinated group prior to the November inoculation and 162 after the inoculations were stopped. Eleven recruits went to the control group, since the cavalry squadron was nearly filled by transferred men. The change in enlisted personnel of the field artillery was due to discharge for reduction of the army, and numerous discharges at expiration of enlistment. It is well recognized that the above transfers and recruiting had the result of placing less of the young soldier element in the cavalry control group than in the field artillery vaccinated group, which latter had, as a consequence, a large element of untrained and short service men. The cavalry control group had retained the married and "old soldier" type at the reduction of the army, while the field artillery lost that desirable type. These extremes in age and service were balanced to some extent, since we included in this control group those not vaccinated in the field artillery vaccinated group, thus diluting the strength of resistance of the old soldier cavalry control group. No attempt was made to vaccinate recruits enlisted and assigned to the field artillery group after November 15, 1921, and hence 162 recruits remained unprotected up to March 20, 1922. The reason for this decision was that the smallpox and triple-typhoid vaccinations of recruits had been delayed during the use of the pneumonia inoculations, and it was considered more important to obey existing and mandatory regulations for the protection against smallpox and the typhoids. Someone may be interested to know that among the 410 transferred men (238 from Camp Meade, Md., to field artillery and



172 from Panama to cavalry) there were three cases of bronchitis and one case of influenza in the controls and there were no respiratory diseases recorded in the vaccinated transferred men.

The vaccine used in the November, 1921, inoculation was known as the "Pneumonia Vaccine" and contained in each c.c. 6,000 million bacteria in broth, as follows:

Pneumococcus, Type I.....	1,000 millions
Pneumococcus, Type II.....	1,000 millions
Hemolytic streptococcus, strain 3.....	1,000 millions
Hemolytic streptococcus, strain 60.....	1,000 millions
Bacillus influenzae.....	2,000 millions

The strains of hemolytic streptococcus are those of the Rockefeller Institute series and represent the types commonly found in respiratory infections. Dosage was  $\frac{1}{2}$  c.c. first, followed by two inoculations of 1 c.c. each at intervals of one week—"common colds," sore throat and fever being contraindications to vaccine administration. Immediately prior to each inoculation medical officers, representing the Army Medical School, examined the nose, throat and teeth of each man, took his temperature and made cultures of both nose and throat, noting any abnormal condition of teeth or tonsils. Twenty-three men were reported as showing enlarged tonsils, and of these, five had hemolytic streptococci present. Of the hypertrophied tonsil cases, three were later admitted to sick report for respiratory diseases, two for influenza, and one for bronchitis. None with hemolytic streptococcus present were admitted. Sixty-eight men were reported as having dental conditions needing attention, which the dental surgeon reports were corrected before March, and that none were of any importance. Of the dental cases six were admitted to sick report for respiratory diseases: four bronchitis and two influenza.

We (again including the enlisted men) have been rather conservative regarding tonsillectomy for moderate tonsillar hypertrophy in youths where no focal infection existed, and we see no evidence, in the above figures, to cause us to change our conservatism. On the other hand, we have been rather radical on the subject of oral sepsis and therefore take some comfort in the dental case results, because the percentage of bronchitis cases is higher.

It may be of some value to state that a special record was kept in the out-patient treatment room for ear, nose and throat cases for February and March, 1922. Patients treated represented chiefly those who had mild influenza-like symptoms, but who were not admitted to quarters or who received "follow-up" treatment after

hospitalization. It also included patients with "common colds" and their attending complications. Informal reports and press accounts from Washington, D. C., made it evident that there was a marked involvement of the middle ear, and other complications, during the prevalence of influenza this winter. We are pleased to note an almost entire absence of complications in our series of cases. There was no record of any pneumonia or suppurative otitis media, and only three cases of catarrhal sinusitis of frontal sinuses, one case of muco-purulent involvement of frontal and ethmoidal sinuses, and one case of catarrhal otitis media. All of the above cases were evenly divided between the vaccinated and control groups. This out-patient record also shows the same ratio of 2 to 1 in favor of the vaccinated for incidence of "common colds" except at the peak of the influenza outbreak, and immediately afterward, when there was little difference between the two classes. The very noticeable reduction at Fort Myer in the incidence of suppurative otitis media, during the winter of 1921-22, as compared with previous winters, garrison strength being the same, must have some relation to our efforts to immunize. It is not likely that the strain of *B. influenza* at Fort Myer was different from the strain in Washington, D. C., and Arlington County, Va., which constitutes our environment.

Plate II, Sec. B, shows results in the vaccinated and control groups, only, from November 15, 1921, to March 20, 1922 (*post-vaccination period*), which results were undoubtedly modified by the influenza outbreak. Records show that as regards tonsillitis and bronchitis cases, the majority occurred in December, 1921, soon after the completion of the vaccination on November 15. Figures for bronchitis and tonsillitis are not favorable for the vaccine. On the other hand, the results in the influenza class uphold the results stated for the January inoculation, with a rate of 2 to 1 in favor of the vaccination. The absence of pneumonia is certainly encouraging when we think of the reported incidence of that complication in influenza reports from the cities on the Atlantic coast. Usually at a station of this size, in close proximity to a large city, there will be at least one case of tuberculosis during each twelve months, particularly when the garrison personnel changes at least 50 per cent. Even as a result of the influenza outbreak, no such case has been discovered, although the X-ray and laboratory have been fully utilized, and a check in doubtful cases made by the Army Medical School laboratories. One obscure case was transferred to Walter Reed General Hospital where the diagnosis still remains in doubt, although the symptoms are pointing to a pos-

sible focal infection. An interesting element has been noted in a recurrence of well-marked influenza symptoms in four patients, none of whom were positive for *B. influenzae* in an attack four weeks previous, and two were positive and two negative for *B. influenzae* in the recurrence just prior to or after March 20, 1922. Of these two negative cases, one showed in the March recurrence only numerous hemolytic streptococci in the nose and throat cultures, and the other cases showed an exclusive and almost pure culture of the latter organism. The recurrent cases disturb our immunity dreams and tend to encourage those opposing the statement that "*B. influenzae* is the sole cause of the clinical entity known as influenza."

## SUMMARY

1. We, including the enlisted men, believe that the "Pneumonia Vaccine," as used at Fort Myer, during 1921 gave positive results in lowering the incidence of respiratory disease, particularly during the continued exposure of an unusual winter in a personnel containing a large percentage of youths under six months' service.

2. We discount the apparent lack of evidence in cases of tonsillitis and bronchitis, well knowing that in mild cases the term "bronchitis" is rather elastic and easily fits a required nomenclature, while tonsillitis occurs often as an exacerbation of a tonsillar focal infection, not easily demonstrated by a ward surgeon and not always checked by cultures if there is no suspicion of diphtheria.

TABLE 1  
INCIDENCE OF RESPIRATORY DISEASES, ENTIRE GARRISON

Diseases	Pre-inoculation period Nov. 1, 1920-Feb. 14, 1921		Post-inoculation period Feb. 15, 1921-May 25, 1921	
	Number of cases	Annual rate per 1,000	Number of cases	Annual rate per 1,000
Tonsillitis.....	31	89.59	25	80.75
Bronchitis.....	19	54.91	29	93.67
Pharyngitis.....	3	8.67	1	3.23
Pleurisy.....	1	2.89	1	3.23
Pneumonia.....	1	2.89	2	6.46
Laryngitis.....	1	2.89	1	3.23
Total.....	57	164.73	59	190.57
Strength (average).....	1,191		1,143	

3. As a result of this feeling on the part of the vaccinated group, and not because they like the actual inoculation, the commanding officer of the vaccinated group has already asked: "Can we be inoculated earlier this fall?" There still is a rivalry between vaccinated and control groups—there is competition—it is still a game.

TABLE 2

INCIDENCE OF RESPIRATORY DISEASES AMONG THE VACCINATED AND AMONG THE UNVACCINATED INDIVIDUALS DURING THE POST-INOCULATION PERIOD—FEB. 15, 1921, TO MAY 25, 1921.

Diseases	Vaccinated		Not vaccinated	
	Number of cases	Annual rate per 1,000	Number of cases	Annual rate per 1,000
Tonsillitis.....	5	73.32	5	41.55
Bronchitis.....	2	24.44	8	66.48
Pharyngitis.....	0	.....	0	.....
Laryngitis.....	0	.....	1	8.31
Pleurisy.....	0	.....	0	.....
Pneumonia.....	0	.....	0	.....
Total.....	8	97.76	14	116.34
Strength.....	302		444	

TABLE 3

INCIDENCE OF RESPIRATORY DISEASES AMONG THE VACCINATED AND AMONG THE UNVACCINATED INDIVIDUALS DURING THE POST-INOCULATION PERIOD EXTENDING FROM NOVEMBER 15, 1921, TO MARCH 20, 1922.

Diseases	Vaccinated		Not vaccinated	
	Number of cases	Annual rate per 1,000	Number of cases	Annual rate per 1,000
Tonsillitis.....	8	62.96	6	37.02
Bronchitis.....	9	70.83	10	61.70
Influenza.....	20	157.40	43	265.31
Pharyngitis.....	0	0	2	12.34
Laryngitis.....	0	0	0	0
Pleurisy.....	0	0	0	0
Diphtheria.....	0	0	1	6.17
Pneumonia.....	0	0	0	0
Total.....	37	291.19	62	382.54
Strength.....	371		473	

## NOTES ON THE HISTORY OF MILITARY MEDICINE

(Continued from June, 1922)

By LIEUT. COLONEL FIELDING H. GARRISON

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### IX. THE EUROPEAN WAR

Henry James once defined aristocracy as "bad manners organized." Carlyle opined that democracy is "an institution that permits Judas Iscariot to slap Jesus Christ on the back." Between these two extremes lies somewhere the delectable *via media* of the Greeks, the *medium tenere tutissimum* of the Romans, the pathway followed by the world's gentlefolk in all periods of historic time. In the 19th century, the great principle, "choose equality and flee greed," was lived up to by all serene people whose feeling for balance, poise, equity, proportion was such that they did not take themselves seriously, did not expect others to take them seriously, and thus maintained their own internal security with a noble simplicity toward their environment and their fellow creatures. Meanwhile, toward the end of the period, the industrial-democratic movement engendered by the Napoleonic wars reached its height. In the olden time, the small producers, the artisans, tradespeople and mechanics, were the people who fed, clothed, buried us and generally took care of us through life. Through the invention of vast numbers of mechanical and labor-saving devices, these now gave way to a great manufacturing and commercial class, which was, in turn, devoured by the régime of capitalists, exploiters and promoters, with an industrial proletariat as its vassals. The effect was to produce a continuous *trek* of countrypeople to the cities, with the usual consequences of new industrial diseases, bad sanitation, poverty, prostitution and high infantile mortality, as Nature's set-off to overpopulation and overcrowding. Under the unnatural stress and competition of city life, the struggle for existence obtained with full force, a phenomenon which received its true explanation, as biological doctrine, in the writings of Darwin. But what the quiet naturalist of Down had described as a working principle in the pitiless scheme of Nature, inimical to the higher development of man (since man carries, in the very structure of his body, the evidences of "his lowly origin"), became, in Schopenhauer's gloomy and powerful picture of human history, the "will to live," as the *impetum faciens* or driving force behind the uglier phenomena of man's existence. In the philosophy of Friedrich Nietzsche, this became the "joyous affirmation of our being" and was exalted into an

ethical principle, in opposition to the Eastern doctrine of the renunciation of existence and the "slave-mortality" of Christianity. Nietzsche was a talented professor of philology, who, as a youth, ran errands for Richard Wagner and whose amatory propositions were repelled by the authoress, Lou Andreas-Salomé. His disinclination to continue as press-agent for Wagner, his disgust at the mawkish parade of Christian symbolism in *Parsifal* (an artistic blunder perpetrated by the composer to please his second wife) led to a break in these friendly relations, which proved a distinct tragedy in Nietzsche's life. He ended his days as a madman. A master of epigram, with an otherwise abominable literary style, his realistic philosophy is the most ferocious assault on the ethics of Christianity ever made. It voices, in brief, the doctrine of the superman or "blond beast" as the natural lord of existence, the inevitable subjection of people with botched bodies and inferior minds as "slave races," the necessity for a thoroughgoing "transvaluation" of all current ethical values, and the old Greek idea of the eternal and cyclic recurrence of all wordly events (history repeats itself). Nietzsche's philosophy is thus a composite of elements variously discoverable in the writings of the pre-Platonic philosophers, Machiavelli, La Rochefoucauld, Chamfort, Stendhal, Emerson, Walt Whitman, Roosevelt and later moderns, and is now become a commonplace in the cheaper fiction of our current magazines. All that Nietzsche has to say of the morbid and mealier-mouthed elements in Christianity, as a practical, working system of ethics, is contained in the epigram of Heine: "Christianity, by inculcating hound-like humility, has proved, in the end, the surest support of despotism;" but with this inconsistency, that Nietzsche regarded despotism and the enslavement of inferior peoples as an excellent thing in itself. The Nietzsche philosophy, once a private luxury of antique despots and more recent artists and literary virtuosi, is thus in the nature of dangerous dynamite in a society based upon industrialism, in which even rulers, soldiers, clergymen, physicians, artists and poets are virtually industrials. It is also inimical to the valid principle which emanated from the Cromwellian brow of Jeremy Bentham—"the greatest good of the greatest number"—upon which modern medicine, sanitation and social endeavor are based.

The small kingdom of Prussia, which after 1870 dominated modern Germany, was developed upon the Roman and mediæval theory of the State as an entity to which the rights of the individual must, on occasion, be sacrificed, and its growth in political and military power was attained, as with the Romans, by making war. Serfdom existed in Prussia until the early years of the 19th century. The dominating military caste or autocracy, endowed with the powerful physical habitus of a Northern

race and with administrative abilities of a unique order (the results of long experience and training), constituted, in a local relation, the tribe of supermen of Nietzsche's dreams. These Nordics were, many of them, not different from other Nordics, in overweening selfishness, arrogant demeanor, hard conceit, mordant, metallic humors,<sup>1</sup> and the blundering mentality which impels the aboriginal male to take the bit in his teeth and drive his head against stone walls; others, of cleverer type, fenced themselves behind the artificial *politesse stérile et rampante* of the 18th century; others, endowed with clear, lucid minds, had the simplicity, courtesy, geniality and inevitable good taste which go with such minds.<sup>2</sup> The general run of the population, described by Maximilian Harden as "a crude but courageous people," were not without some of the virtues which Lord Byron satirically ascribes to "the nations of the moral North," and there were French and Jewish refugee elements that made for practical ability and sense of real values.

Upon this people devolved the management of the great German Empire after 1870. The government was entirely in the hands of the privileged caste, with the Kaiser as supreme war-lord, and a highly organized bureaucratic machine which, not unlike that of mediaeval Byzantium, controlled the public affairs of the smallest and remotest hamlets. The success of this administrative machine in regulating commerce, customs duties, agriculture, finance, education and the sanitation of model cities was, for a long time, the admiration of the civilized world. The German organization of scientific investigation, their remarkable thoroughness in physics, chemistry, medicine and other branches of laboratory science, as also their skill in mechanical inventions and mechanisms of precision, made them the masters of reality; while, at the same time, the South German production of many charming things of human interest, from music "the best in the world" to children's toys and the Christmas tree, were so attractive that many cultivated people regarded Germany as their "intellectual home." Germany was regarded as the model state, and, partly in consequence

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<sup>1</sup> The offensive, and somewhat meddlesome, type of banter, which would elsewhere be resented as a gross personal liberty, was noted by John Jay and other American travellers in the early 19th century, and even in the private letters of the charming alto, Hermine Spiess. Theodor Fontane, the poet of Berlin and of the *Preussentum*, describes the typical Berlin *Hausvater* as ready to snap his wife's head off on the slightest provocation, no matter how amiable, reasonable, affectionate or submissive her disposition might be.

<sup>2</sup> Of all officers of the Prussian Army, there were none of finer mould than the late Surgeon General, Leut. Gen. Otto von Schjerning. He was genial, pleasant, courteous, affable, and as shown by his introduction to the German Medical History of the War, absolutely fair-minded and free from prejudice. He was incidentally one of the masters of Roentgenology, in which he could have made a great reputation, but for his tendency to efface himself, using his high position to forward the science behind the scenes, and encouraging others to "go up and occupy" as Sidney Herbert did in the case of Parkes' treatise on hygiene.

of this adulation, there grew up, following the accession of Wilhelm II, the ancient Jewish cult of a "chosen people," the same cult which Matthew Arnold ridiculed in the Anglo-Saxons of the post-Napoleonic period. The short, successful campaigns of 1864-6 and 1870 engendered the belief that more could be accomplished in wars of conquest. For nearly half a century (1870-1914), preparations of the most intensive and extensive character were made, including wholesale manufacture of ordnance and munitions, training of the available male population for instant mobilization, an enlarged navy, the new devices of submarine and dirigible aircraft, an elaborated system of spies and foreign agents for propagandism, and the education of the people, from childhood up, in the hope and belief that German efficiency was predestined to dominate the world.

All this produced a narrowing, brutalizing effect upon the minds of the people, who, in earlier days, had been universally liked for a certain broad, genial, tolerant, good-humored and hospitable humanity. It began to be perceived by observant travelers that the multiform Germany of the past, the Germans of the older romantic dispensation, existed only in spots. Continental Europeans, and expatriated Americans who were "in the know," realized that a great world war was inevitable, but the warnings of shrewd observers, like Lord Roberts, Lauder Brunton, Chéradame, Emil Reich and others, were either ridiculed or ignored. The pre-disposing and exciting causes of the pan-European war, some of them rooted in the remote past, are multiplex and defy analysis, but overwhelming evidence exists that it was deliberately planned and precipitated, and that, in the words of Norman Thomas, "it was not a spontaneous outburst of racial antagonism but a clash of imperialist interests, primarily economical, brought about by financiers, diplomats and soldiers, who for shortsighted ends played upon mob psychology." The tragedy at Sarajevo, followed by the Servian imbroglio, fired the train, and the Kaiser declared war on August 1, at 7.10 p.m. The effect was that of the thunderclap preceding a great storm of uncertain duration. In the lull which followed, people had time to collect their thoughts a little. Just before the declaration of war, Wilhelm Ostwald had denounced the hysterical "fear of Russia" apparent in Germany. Americans were puzzled that the Germans, then at the top-notch of their commercial prosperity, should, contrary to Bismarck's warning, challenge fate<sup>3</sup> and imperil their future by

<sup>3</sup> The Franco-Prussian War was precipitated by Bismarck, but in after years he was wise and temperate in his foreign policies, realizing that the next great European War would be a "*saignée à blanc*." In his later period, he declared that his governing principle was "*Unda fert, nec regitur*"—to be guided by the trend of events rather than to attempt to direct them. His seal-ring bore the Russian device "*Nichevo*," i.e., take things as they come.



"fighting for piffle." The English remained, as usual, cool and collected, and Parliament went into the war, like the Elizabethan seafarers, with bursts of laughter. German newspapers requested that, for economy of administration, the Allies send in their declarations of war "by the dozen" (*dutzenderweise*). Meanwhile, Lord Kitchener predicted that the war would last at least three years and stated the prophetic belief that few of those who began it would live to end it. Little realizing what was in store for them, the German regiments, in brand-new field-gray uniforms, marched down to the Rhine, singing their patriotic songs, to meet a vigorous and valorous counter-check in Belgium, and eventually to settle down to the bloody stalemate of the Western Front. As the immense conflict wore on it began to shake the remote confines of America, Asia and Africa. The conviction penetrated the minds of most reasonable people that the precipitation of this war was a crime of *lèse-humanité*, or, in the words of Sudermann, "the most gigantic imbecility since the Crusades." It meant the destruction of the 19th century civilization, the advent of a drier, more tedious, more metallic order of things, in opposition of the broad, inclusive ways and designs of multiform universal nature. It was felt that the future of humanity, the hopes of centuries of patient endeavor, were at stake in this war, and it was upon this world-wide conviction that the Allied nations were eventually able to gather force to end it. The three wars which preceded the World War had considerable teaching value, but, except in military medicine, the lessons were not heeded.

The South African War (1899-1902) was, in respect of the curious Anglo-Saxon indifference to preparedness, not unlike the Crimean or Spanish-American wars. In the early stages, the British suffered considerably (especially in officer personnel) from the pitiless marksmanship of the Boer riflemen, who were natural skirmishers; it was not until Kitchener had concluded his enveloping operations that the contest was brought to successful termination. The only field medical units, Lynch points out, were the litter-bearer companies (organized 1879-80), the field hospitals (one for each brigade), with additional reserve hospitals for divisions and corps, but no clearing houses for the sorting and evacuation of the wounded to the rear. This led to the invention of the mobile casualty clearing station or evacuation hospital (1907), situated at railhead, for *triage*, housing and ultimate evacuation by improvised hospital trains. Difficulties with typhoid fever brought about the initial experiment in preventive vaccination of a command, which, while not entirely successful, established the practice in military procedure. The reorganization of the Royal Army Medical Corps following the war resulted in enlarged authority for British medical officers, better education and training at Netley, increases in medical personnel and supplies, the union of litter companies and field hospitals to form field ambulances (1905) and the foundation of the Journal of the Corps, devoted to military medicine.

The Russo-Japanese War (1904-5) found the Japanese army well organized along German lines, particularly their medical department, which employed Letterman's

system of evacuating the wounded, at the same time filling in the lacuna in Letterman's organization (which had no bridge between field hospitals and base) by means of "Reserve Medical Personnel," the equivalent of evacuation hospitals. The Russian service was poorly organized, except on paper, and, like the Austrian, was behind the times in the matter of assigning line officers to command medical units, although an order to the contrary effect had been issued, too late to change anything in the field. The adequacy of the Japanese divisional and regimental medical service was demonstrated at Mukden, where they evacuated their wounded with precision, while the Russians suffered terrible losses and elsewhere depleted their firing lines by detailing hundreds of enlisted men to escort the wounded to the rear. In the Japanese Army, the Red Cross was subordinated to the Medical Department; in the Russian Army, it was given an independent status, causing vast confusion. The Japanese first employed advanced methods of sanitation and front-line surgery (with high mortality of medical officers) as a means of saving and salvage of personnel. This new principle being writ large in their battle-orders ("The Russians have more men, but we can save more men"). The Japanese estimates for adequate medical personnel in field operations (10 per cent of command in wartime) led to the establishment of this ratio, both in our tables of organization and in the European War; and the incorporation of evacuation hospitals in our medical administration (1910) was derived from this war, which, with the two Balkan Wars of 1912, was effective in demonstrating the high efficiency of the new methods of field administration in stationary or trench-warfare, under the stress of long-range guns and high-power explosives. Even our popular magazines made it plain to the public that the days of old-fashioned warfare in the open, with charges led by a general on horseback, were over.<sup>4</sup>

The European War began with the German blunder of the invasion of Belgium, which, through the heroic resistance of the Belgians at Liège and Namur, delayed the invasion of France by two weeks. The French blunder of a counter-invasion of Alsace-Lorraine, instead of squarely facing the enemy on the north, resulted in the disasters at Mons and Charleroi (August 21-23) and brought von Kluck's army within 25 miles of Paris. The battle of the Marne (September 6-10) saved the day for France. Then began the race for the Channel ports along the Yser line (September 20-October 20), in which the Germans captured Antwerp and Lille, but were repulsed at Ypres (October 31) and so failed to reach Calais and Boulogne.

On the Eastern frontier, the Russian invasion on the north was checked by the Germans at the battle of Tannenberg (August 26), but the Russian thrust through Galicia resulted in their capture of Lemberg (September 5), while the Serbs defeated the Austrians on the Jedar, drove them out of Galicia, and invaded Bosnia and Herzegovina. To save the situation, the Germans were forced to withdraw troops from the Western Front, and invading Russian Poland, were defeated at Warsaw (October 20), but won out at Lodz. On February 12, 1915, Hindenberg overwhelmed and destroyed the Russians in the battle of Mazurian Lakes, but, in Galicia, the Russians captured the fortress of Przemyśl (March 22). The Russians were then overwhelmed by Mackensen and Hindenberg, their whole line, from the Baltic to the Carpathians, was thrown back, with terrible losses

<sup>4</sup>Through kind permission of Col. Chas. Lynch, M. C., these data have been derived from his valuable introduction to "The Medical Department of the U. S. Army in the European War," soon to be published.

(1,200,000 killed and wounded), and Warsaw fell on August 5. Turkey had joined the Central Powers on October 29, 1914, and Italy went over to the Allies on May 23, 1915. By this time, the contest on the Western Front had resolved itself into "warfare of position" (trench warfare), with failure of the Allies to pierce the German lines, through lack of adequate artillery and munitions. The British were practically defenseless in the costly episode at Neuve Chapelle (March 10), the French offensive in the Champagne came to nothing, and, through the use of gas, the Germans all but broke through to Paris in the second battle of Ypres. Frustrated on the sea in the naval actions of Heligoland and the Falkland Islands, the Germans began to make war by means of submarines, bombing of unfortified towns by air-raids, the use of poisonous gases and "frightfulness." Although the London *Punch* had pronounced the Zeppelin "my best recruiter," Great Britain was forced to adopt compulsory military service on May 25, 1915. The sinking of the *Lusitania* on May 7, 1915, with loss of 1,198 lives (124 Americans), made it a foregone conclusion that the United States would eventually enter the war. Manufacture of munitions was forwarded on a grand scale, the Allies obtaining munitions and supplies from America, the Germans exhausting the supplies of the Scandinavian and other neutral countries. Serbia was overwhelmed by Mackensen in October-December, 1915.

On February 21, 1916, the Crown Prince began his offensive against Verdun, having occupied the St. Mihiel salient since 1914. Douaumont was captured, but at Vaux and Le Mort Homme (March 8-16), Petain held his 30-mile line against the Germans, and, in spite of the pronounced German advance in May and June, his famous dictum, "*Ils ne passeront pas*," held good. The losses on both sides were about 500,000. The Allied offensive on the Somme (July-November) relieved the pressure at this stage. The British introduced tanks, and the Germans pill-boxes of masonry behind their third-line trenches, while dug-outs, concrete chambers, camouflage, automatic rifles, hand grenades and antique helmets were in use on both sides. In the summer, the Russians were victorious against the Turks in Armenia and reinvaded Galicia, overwhelming Bukovina after their victory at Lutsh (June 6). Under false promises from the disloyal Petrograd régime, the Roumanians entered the war on the Allied side in July, but were overwhelmed by the Austrians, Germans and Bulgarians under Mackensen, and Bucharest fell on December 6. The British offensive in Mesopotamia had proved a total failure, particularly in medical organization, and terminated with General Townshend's surrender to the Turks (April 29). The naval battle off Jutland (May 31, 1916) terminated in a draw, but the Germans confined themselves to submarine activities thereafter.

The signal events of the year 1917 were the Russian revolution, resulting in the deposition of the Czar (March 15), and the entry of the United States into the War (April 6). Russia, undermined by German agencies in the central administration, from the Czarina down, dropped out of the war and was given over to anarchy and Bolshevism. The year 1917 was the darkest of the war and little could be accomplished before the summer. In March, following the Allied advance between Arras and Soissons, the Germans withdrew to the Hindenberg line, 60 miles long, in consequence of which the British attack on Arras resulted in only slight gains. In midsummer (July-September), a new Allied offensive was begun in Flanders, with the object of destroying the submarine bases at Zeebrugge and Ostend, but this also resulted in comparative failure. Submarine warfare was now unrestricted and vessels "*spurlos versenkt*." The successful Italian offensive on the Isonzo front (May-September) was counterchecked by an unexpected Austro-Hungarian drive into Northern Italy in November, resulting in the disaster of Caporetto and the Italian retreat to the Piave River, 15 miles from Venice, checked only by French and British reinforcements. The British failure in Mesopotamia was retrieved, however, by General Allenby's invasion of Palestine from Egypt, resulting in the capture

of Bagdad (March 11) and Jerusalem (December 9), a triumph of tactical maneuvering. A new British offensive at Cambrai (November 22–December 31) was partly successful, through the employment of tanks. The United States declared war on Austria on December 7. In the treaty of Brest-Litovsk, the Russian Bolsheviks made peace with the Germans, thus enabling the latter to concentrate all their forces on the Western Front.

Early in 1918, the Germans began to prepare for a great final offensive, and the Allies coordinated and unified their efforts under the supreme command of General Foch (March 28). On March 21, Ludendorff began his drive on the Somme, with an army of 1,800,000, eventually covering a front of 100 miles, and on several occasions almost succeeded in breaking through the lines by ruthless sacrifice of dense formations, hurled forward in successive waves. Although the whole Somme area was reconquered, the offensive around Chemin Des Dames was blocked by Foch's superior strategy, but a third drive (May 27), deploying 400,000 men, reached the Marne (40 miles from Paris) and extended to Château-Thierry. A fourth offensive in the Rheims sector (July 15) was balked, and immediately thereafter the general Allied offensive was launched by Foch on July 18. In this, American troops, who had taken part in different sectors since November, 1917, distinguished themselves signally in blocking the German advance at Château-Thierry (July 18), in reduction of the St. Mihiel salient (September 12) and in the subsequent offensive in the Meuse-Argonne region. The Allied advance was along the whole line from the Channel to Verdun, the Germans, retreating through Northern France and Belgium, with rear-guard action. The signing of the Armistice on November 11, 1918, enabled the enemy to retire without further damage to themselves.

In the matter of medical administration for the war, the French, like the Germans, mobilized all their physicians for the service of the country, those too old for field duty continuing at their posts as practitioners and teachers, at the same time managing, on occasions, difficult cases from the front at their special clinics. In this way, much valuable original work was incidentally done in neurology, oto-rhino-laryngology, orthopedics and the other specialties. The device was possible in France, Germany, and eventually England, because, in these countries, clustered as they were about the theatre of war, the distance between front line and base was not great. Some elderly practitioners even rendered valuable military service in mufti. Blanchard, the eminent parasitologist, originated the idea of evacuation of the wounded by aeroplane. Tuffier, in some respects the most influential medical personality in France, managed the administration of front-line surgery for the entire army in civilian attire, his directions about procedure and technique being transmitted by telephone along the whole line, where necessary. England, facing the necessity of raising a corps of 12,000 medical officers as speedily as possible, had to acquire no less than 11,000 of these from the civilian profession, and it was her application for 3,000 additional medical officers from America that speeded up the mobilization of our own Medical Reserve Corps. The Italians, who entered the war late, with ample time for preparation, profited by the experience already gained by the French and English (as we did) and thus acquired

an excellent medical organization. The medical department of the German Army was fully prepared as to personnel, supplies and rolling stock, and had even blocked out methods for the reconstruction and reëducation of the wounded and disabled ten years before the war.

During the war period, our own army, with an authorized strength of 230,656 (Act of June 3, 1916) expanded from a nucleus of 217,272 officers and men (January, 1917) to a force of 1,452,516 officers and men in one year's time, and, at the date of the armistice, comprised 3,567,856 officers and men, or nearly twelve-fold expansion; while the Medical Corps, which, on June 30, 1916, consisted of 443 medical officers, 146 medical reserve officers on active duty and 4,670 enlisted men, had expanded by November 30, 1918, to an organization of 30,591 medical officers (989 regulars, 29,602 temporary) and 264,181 enlisted men, a total of 294,772 on active duty. At the end of the war, the Medical Corps was thus one and one-third times the size of the whole Regular Army of January, 1917. Two new organizations, a commissioned Sanitary Corps and a commissioned Ambulance Service were created, and as shown in the Surgeon General's Reports, the commissioned Dental Corps was expanded from 86 to 4,620, the commissioned Veterinary Corps from 62 to 2,002, the contract surgeons from 181 to 939, the Army Nurse Corps from 403 to 21,480, and the civilian personnel from 450 to 695. The Surgeon General's Office was expanded from a personnel of 7 medical officers and 148 civilian employees (April 6, 1917) to an organization of 32 administrative units, with a personnel of 262 medical officers and 1,889 civilians (November, 1918). For the Medical Department, Congress had appropriated, by November 4, 1918, a sum of \$471,188,948, of which \$314,544,000 was spent, or only 2.2 per cent of the total war expenditure, estimated at \$14,244,061,000. This expenditure was wisely, liberally and carefully administered by the Division of Finance and Supplies of the Surgeon General's Office, which did signal service in creating new supply depots in our larger cities, getting in immediate touch with the leading manufacturers and merchants of the country, fostering the manufacture of drugs, instruments, bandaging material, and patented preparations which could no longer be obtained from Europe, and giving all necessary aid to the prompt shipment of these articles to the Western front.

A remarkable feature of the World War was the exploitation of all branches of science, from mathematical physics to psychology, from anthropology to entomology, and the utilization of the aid of scientific men on a scale never dreamed of before. In Germany, this had gone on for years, as part of the definite scheme of preparation for war of conquest, and the spectacled physicist and chemist in the dim background behind the General Staff became, in reality, a more formidable personage than the bomb-thrower or the infantryman in act to charge the trenches. During the war-period, the chemist Emil Fischer occupied himself with such various problems as explosives, the invention of substitutes for animal fats, experimentation with synthetic foods and artificial means of obtaining nitrogen. In England, physiologists like Starling and Leonard Hill rendered valuable service in the problems of war-gassing and asphyxiation, while Henry Head gained new insight into the physiology of the nervous system from the phenomena engendered by battle-wounds; Mott studied shell-shock and Lewis the neuro-cardiac syndrome,

adumbrated by Da Costa. In France, Marie and his fellow-neurologists enlarged the science of peripheral nerve lesions and of hitherto unstudied syndromes engendered by gunshot wounds of remote parts of the central nervous system; Carrel applied to wound-treatment the solution of a gas in a liquid devised by the English chemist Dakin, and the experts in reconstruction invented novel mechanical substitutes for the human hand to enable the mutilated soldier to gain a livelihood in various avocations. In our own army, the psychologist determined the mental age of the enlisted man, the anthropologist measured him, the psychiatrist gave further aid in passing upon his mental condition, the metabolist and food chemist passed upon his ration, the physiologist and otologist determined the service requirements of the aviator, the physiologist and pathologist studied the effects of war-gasses, and the eye and ear specialists forwarded the reëducation of the war-blind and war-deaf. In the first year of the war, the most eminent medical men of the country flocked to the colors and their services materially enlarged the scope of military medicine. Had it not been for the submarine difficulty, it would have been obviously simpler and more practicable to transport the major part of our drafted forces directly to France, for training adapted to conditions in the war zone. But even before the arrival of the Chief Surgeon in France, six fully equipped base hospital units managed to get across (May 8-25, 1917), viz., those from Cleveland, Boston, New York, Philadelphia, St. Louis and Chicago, which were distributed among the British Expeditionary Forces. In all, 50 base hospital units were overseas by June 18, 1918. On September 4, 1917, through the bombing of the hospital group at Dannes Camiers by a German aëroplane, Lieut. William T. Fitzsimons and others were killed. The first American to render the supreme sacrifice was a medical officer.

Shortly after the arrival of General Pershing and his staff in Paris on June 13, 1917, Colonel Bradley (Chief Surgeon, A. E. F.) and his assistants set about the problem of acquiring hospitals for the base ports and lines of communication. The American line of troops being on the extreme right of the western front, in the vicinity of Belfort, the locus of hospital sites was a line passing through the four base ports (Bordeaux, La Rochelle, St. Nazaire, Brest), the training areas (Gondrecourt, Neufchâteau, Mirécourt, Valdahon) and along the two lines of communication, viz.: (1) St. Nazaire, Nantes, Angers, Tours, Romorantin, Gièvres, Nevers; and (2) Bordeaux, Périgueux, Mijes, Chateauroux. As our troops poured into France and casualties began to come in from the battle-lines, the original estimates for hospital beds was advanced from 73,000 beds to 600,000. On May 15, 1918, thirteen days before our First Division got into action (capture of Cantigny), there were already 30,187 beds available. On Armistice Day there were 261,403 beds available in France, with 193,448 patients in hospital (99,405 sick, 99,043 wounded), and in the home territory, 121,883 beds, with 69,926 patients, or a total of 353,887 beds in France and the United States, over twice the number available for the Union forces

in the Civil War (118,057 beds). The larger hospital centers in France (Allerey, Bazoilles, Toul, Mesves, Mars, Savenay) were originally 1,000 bed units, with a crisis expansion but some of these became in time great communities of as many as 30 base hospitals, with an emergency bed capacity of 10,000-40,000 beds. The Mesves Hospital Center had, in November-December, 1918, 25,000 beds, with 20,186 patients (November 11), the total personnel and patients (28,828) outnumbering a division of infantry. Evacuation of the wounded from front to base, and eventually to the home territory, proved a large contract for the Service of Supplies, on account of the initial difficulties in obtaining hospital trains and other rolling stock, the frequently impassable conditions on the roads leading to the battle front, the stalling of vehicles and other disagreements common to war-zone operations. By November 11, 1918, 129,997 patients (50,580 sick, 79,517 wounded) had been evacuated in 21 hospital trains of 16 coaches each, while 197,708 primary evacuations had been made in 50 trains lent by the French. Some 6,875 ambulances were sent to France and Italy and about 50 barges were in use on French waterways. By November 11, 1918, 86,642 patients had been evacuated by ship from the base hospital ports to the United States.

The Chief Surgeon's office at Tours was organized in five administrative divisions, controlling the services of hospitalization, evacuation and hospital administration, sanitation, sanitary inspection and medical statistics, personnel, medical supplies, finance and accounting. The Service of Sanitation of the A. E. F. covered the organization of stationary and mobile laboratories, controlled by a Central Laboratory at Dijon, the sanitation and sanitary inspection of training and hospital areas, camps, base and their local hospitals, combat areas (trench hygiene) and moving armies, the preparation of the sick and wounded reports, and the analysis and study of communicable diseases in the Office of Epidemiology. The Central Laboratory provided for the prevention of threatened epidemics, allotment of standard supplies, training and research work. By coöperation with the Chief Engineer's Office, a supply of pure water was insured, while routine examination of water supplies was managed by the Central Laboratory. Through the experts sent over by the Food Division, S. G. O., a modified ration was established by G. O. 176, G. H. Q. (October 11, 1918). At the Army Sanitation School at Langres, lectures and training were given by experts in all branches of military medicine. These were of eminently practical tendency, based upon actual experience in the war-zone, and included the training of dental officers in field duty, extended in this case to administration of anesthetics, first aid and general minor surgery.

In the Surgeon General's Office at Washington, the Personnel Division built up the expanded Medical Reserve Corps and other branches of the medical service, the Division of Sanitation looked after the sanitary inspection of all army stations in the country, particularly the 32 training camps (some of the communities of 40,000-50,000 people), and, at the same time, managed the inspection of food, the prevention of communicable diseases, epidemiology, the developmental battalions and the preparation of medical records and statistics; the Hospital Division supervised the construction and management of camp, general and other hospitals; the Laboratory service was in charge of a special division, which also controlled communicable and venereal diseases; the Divisions of Medicine and of Surgery selected professional personnel and equipment for the hospitals and other stations, while neurology, psychiatry, psychology, dentistry, veterinary medicine, anthropology, gas defense, aviation service and physical reconstruction were each of them separately administered. The Medical Training Camps at Fort Oglethorpe and elsewhere gave intensive military, professional and special training to Medical Reserve Officers, while those admitted by examination to the Regular Corps received training at the Army Medical School. At the Medical Training Camps, certain defects in American medical

education at various schools revealed themselves. In prosecuting the medical history of the War, every encouragement was given to medical officers to publish the results of the findings in hospital or laboratory, where time and opportunity afforded, and a number of magazines and practical handbooks were printed. In 1916, THE MILITARY SURGEON was improved in format and typography, and became the principal repository for articles of this kind. Much valuable assistance was rendered to the Medical Department by the American Medical Association, the Council of National Defence, the National Research Council, the American Red Cross, the Rockefeller Institute, the Carnegie Institution of Washington, the U. S. Public Health Service, and other governmental departments and extra-military organizations. During the war period, the medical administration of the British army was conducted by Gen. Sir Alfred Keogh and his successor Gen. Sir John Goodwin, that of the French by MM. Justin Godart, Simonin and Tuffier, that of the American by Gen. William C. Gorgas, that of the German by Lieut. Gen. Otto von Schjerning. The Chief Surgeons of the American Expeditionary Forces were Gen. Merritte W. Ireland and (after October 4, 1918) Gen. Walter D. McCaw.

### *Statistic and Battle Losses*

It is roughly estimated that nearly 60,000,000 men were mobilized by the 16 nations engaged in the World War, and that of these about one-third died or were killed, of whom over 7,000,000 were soldiers and sailors. The number of civilians who died from direct or indirect causes was tremendous. The following table gives an empirical estimate of the military losses, compiled from various sources:<sup>5</sup>

Nation	Mobilized	Killed and died from wounds or disease	Wounded	Missing or prisoners	Total
British Empire.....	8,654,467	929,812	2,097,994	32,391	3,063,664
France.....	8,407,000	1,109,000	3,025,613	252,900	4,387,513
Russia.....	12,000,000	1,700,000	4,950,000	2,500,000	9,150,000
United States.....	4,175,367	112,855	224,089	14,363	351,207
Italy.....	5,500,000	460,000	947,000	1,393,000	2,800,000
Belgium.....	267,000	104,779	77,422	10,000	192,201
Roumania.....	750,000	200,000	120,000	80,000	400,000
Serbia.....	707,343	322,000	28,000	100,000	450,000
Montenegro.....	50,000	3,000	10,000	7,000	20,000
Greece.....	230,000	15,000	40,000	45,000	100,000
Portugal.....	100,000	4,000	15,000	200	19,200
Japan.....	850,000	300	907	3	1,210
Germany.....	11,000,000	1,686,061	4,211,469	991,341	6,888,871
Austro-Hungary.....	6,500,000	800,000	3,200,000	1,211,000	5,211,000
Bulgaria.....	400,000	101,224	152,399	10,825	264,448
Turkey.....	1,600,000	300,000	570,000	130,000	1,000,000
Total:					
Allied Powers.....	41,649,177	4,960,746	11,535,718	4,434,857	20,934,995
Central Powers.....	19,500,000	2,887,285	8,133,868	2,343,166	13,364,319
Grand Total.....	61,149,177	7,848,031	19,669,586	6,778,023	34,299,314

<sup>5</sup> General Goodwin's estimate of British losses, furnished to the Surgeon General on January 12, 1921, was 474,254 killed in action, 139,664 died from wounds, 69,912 died from other causes, 1,668,573 wounded, 143 missing; total: 2,352,546. The French data, as above given, were furnished to the Surgeon General by Brig. Gen. L. Collardet, Military Attache of the French embassy on April 22, 1921. The Belgian data were furnished by Regimental Surgeon Voncken, editor of the *Archives Medicales Belges*, about the same time.



In the British Army, exclusive of Indian and African troops, the total losses were 569,143 killed in action, 170,509 died of wounds, out of 1,025,800 wounded, 83,975 died from other causes, and 143 missing. The Germans had 1,531,048 killed in battle and 155-013 died of disease out of 19,461,265 admitted to hospital (total mortality: 1,686,061). Their total mortality from wounds has not yet been computed. Their total losses were nearly 7,000,000, those of Russia even larger. Of our own wartime army, estimated at between 3,567,856 and 4,123,345 officers and men, 2,039,329 reported in France, and of these about 28 divisions (784,000 men) got into action. The total mortality on the Western front was 75,658, viz., 34,249 killed in action, 13,691 died of wounds, 23,937 died of disease, and 3,681 from homicide, suicide, drowning and other accidents. The total mortality of the U. S. Army from April 6, 1917, to December, 1919, was 112,855, including 54,105 from battle casualties and accidents and 58,075 from disease. Thus the mortality from battle casualties on the Western front up to the Armistice was over twice that from disease, while in 1917-19, the disease mortality was 10,076 higher than that from wounds, due to the devastating effects of the Spanish influenza epidemic in the training camps of the home territory. The casualties among our medical officers in France number 442, including 46 killed in action, 212 wounded, 22 died of wounds, 101 died of disease, 9 died from accidents, 4 lost at sea and 7 missing in action, showing that over one-half (258) were killed or injured from exposure to enemy fire and nearly one-fourth died from exposure to infection in hospital or otherwise. General Goodwin estimates the battle casualties among regular and territorial medical officers of the British Army as 23,504, viz., 3,181 killed in action, 1,429 died from wounds, 1,887 died from disease and other causes and 17,007 wounded, an impressive showing. The effect of the vast improvement in wound-treatment by modern methods is indicated by the fact that, in the Civil War, 31,978 died from wounds in hospital (10.48 per 1,000), in the World War, 13,691 (4.5 per 1,000). The highest incidence of war-wounds in hospital occurred during the Argonne-Meuse campaign, viz., 38.37 per cent of admissions to hospital, with 41.52 per cent of deaths from such wounds. Comparative estimates in the Surgeon General's Reports and the statistical data in the Medical History of the War indicate that nearly twice as many were killed outright by shell-wounds as were admitted to hospital for such wounds, while the ratio of wound-incidence to deaths in the case of shrapnel was 15.08 per cent : 14.50 per cent. On the other hand, the wounded from aeroplane accidents, aerial bombing, shell and shrapnel wounds had a higher case-mortality in hospital than rifle or pistol wounds, while recovery was the rule in the case of gassing. The experience of the Western front is to the effect that gassing is not nearly as destructive as gunshot injuries, while wounds of the chest and the extremities were most frequent, there were fewer chest and arm wounds than in the Civil War, and more of the head and lower extremities. More than twice as many men were killed from head wounds as were admitted to hospital and nearly seven times as many for wounds of the abdomen, spine and pelvis. The number of killed and of wounded from injuries of the lower extremities was about equal.

### *Military Surgery in the World War*

Dr. W. W. Keen has drawn a vivid contrast between the surgery of the Civil War and that of the World War.<sup>6</sup> In the Civil War, chloroform and ether were employed, but the hypodermic syringe, clinical thermometer, retractors and hæmostatic forceps, sterilized gauze, rubber gloves, motor ambulances and mobile laboratories, first-aid packets, trained nurses, X-rays, antisepsis, iodine solutions, and preventive vaccination were unknown, and field surgery was eked out by the use of germ-laden sponges, bullet-probes and silk-ligatures, wounds being explored or widened by surgically unclean fingers, wound-infec-

<sup>6</sup> W. W. Keen: *New York Med. Journal*, 1915, ci, 817-824.

tion, septicæmia, pyæmia, erysipelas, hospital gangrene and tetanus were common and suppuration the rule. Even S. D. Gross sometimes sharpened his knife on his boot and threaded suture-needles by wetting the silk with saliva. In the World War, the leaden Minié ball, with its tendency to lodgment and deformation, was replaced by the jacketed bullet, of high velocity, effective range and penetrating power at long range, but pulverizing hard bone at close range, as was common in the shortly separated trenches of France and Belgium. Even more frequent and more destructive were the effects of explosive shells, shrapnel, hand-grenades and bombs which had been familiar to military observers in the Russo-Japanese War, while aéroplane bombing, dropping of high-power explosives from Zeppelins, gassing, and the use of *Flammenwerfer*, "whiz-bangs" and other ancient or modern devices added to the general havoc and increased the surgeon's responsibilities. The first fact borne in upon the surgeons of the Western front was La Garde's principle that there is no such thing as a sterile gunshot wound. The soil of France and Belgium, cultivated, manured and defiled by the excreta of animals for centuries, was found to be so laden with *B. Welchii* and other pathogenic germs that Dr. Sidney Rowland was able to inoculate a guinea-pig with gas-gangrene from a few drops of its muddy water, the animal dying in eighteen hours. Long periods of duty in the muddy, and sometimes filthy trenches, furthermore, made the soldier's skin, as well as his uniform, dirty and germ-laden, so that bits of the latter driven into the wound almost inevitably produced infection. Again, the rotary motion of the modern jacketed bullet, which leaves the rifled muzzle of the weapon making 2,500 revolutions on its long axis, reduces the soft tissues penetrated by it to a devitalized pulp, which undergoes necrosis and is otherwise an ideal medium for growth of pathogenic bacteria. Surgical asepsis, under such conditions, was impossible; it became necessary to go back to the fundamental Listerism or antiseptics. It was soon found, however, that strong antiseptics, applied to deep infected wounds, would not sterilize them. There followed a long series of "trial and error" experiments with such milder preparations as the synthetic dyes of the triphenylmethane series (crystal violet, malachite green, brilliant green), trypaflavine (acridine series), the mixture of bismuth subnitrate, iodoform and paraffin known as "hip" (Rutherford Brown), or the hypertonic salt solutions recommended by Sir Almroth Wright to facilitate wound repair by increasing the flow of lymph from the wound-surfaces. Through the necessity of applying these mild antiseptics continuously to the surface of such wounds, practice settled down to the use of the neutral sodium hypochlorite solution devised by the English chemist H. D. Dakin, which was devoid of the irritating free alkali in the commercial hyperchlorites commonly employed in the sterilization of water. Continuous irrigation of the wound was secured by Carrel's device of inserting a series of rubber supply tubes, arranged like an inverted Jewish candlestick and fed by a common tube from the receiver. This liquid, along with Lorrain Smith's neutral mixture of calcium hyperchlorite and boric acid (eusol), depended for its action upon the disinfecting property of the free chlorine held in solution, which was also true of dichloramine-T, subsequently introduced as a spray for wound-infection, throat-infection or sterilization of meningococcus carriers by Dakin. The principle was copied by the Germans, who, at the same time, introduced such preparations as vuzin or eucupine, depending for their action upon the release of free formaldehyde, as, in the case of formamint and other preparations devised by them for the treatment of infections of the throat, conjunctiva, genital tract, etc. In spite of the success of these devices in the stationary hospitals, continuous application of the Carrel-Dakin solution was practically impossible during the long transit of the patient from evacuation hospital to base, which sometimes occupied twelve hours or more. The forgotten principle of *débridement* or excision of the devitalized, necrosed portions of the wound, with primary suture, was revived by Lemaître and H. M. W. Gray, and in this

way, the danger of infection between front and base was effectually bridged over, and thousands of lives were saved. When our forces arrived in France, wound-excision was still in the trial stage, but it soon became firmly established as a true aseptic principle in front-line surgery. The comparative percentages of case-mortality of wounds in the Civil War and the World War, as given in the Surgeon General's Reports, show the great advances made in wound treatment on the Western front. The case-mortality in wounds of the head and the extremities in the World War was reduced by nearly one-half, with material reduction in wounds of the chest, neck and genitals, while wounds of the back and abdomen showed a higher case-mortality in the World War, due to the destructive character of the newer artillery projectiles and explosive shells. Wounds of the abdominal and pelvic viscera were relatively hopeless in both wars for this reason, but the case mortality in gunshot fractures of the long bones and joints was reduced in astonishing measure. The successful transportation of such fractures over long distances was greatly facilitated by the revival of the Thomas splint and the subsequent use of the Balkan frame. New light was thrown upon the pathology, prevention and treatment of traumatic shock through the investigations of Porter, Crile and Cannon. Roentgenography was freely employed in the location of bullets, and through many new inventions and the splendid equipment of the American teams, great advances on the technical side were made. Anaesthesia under the new conditions was carefully studied and became a fine art in the great war. Brilliant work was done in abdominal, reconstructive (orthopedic), maxillo-facial and neurological surgery, and the surgery of the chest was forwarded by experimental laboratory investigation. In this history, the names of Tuffier, Morestin, Lemattre, Willems, Depage, Moynihan, Makins, Gillies, Jones, Cushing, Crile, Blake, Bastianelli and Vanghetti will be memorable. In surgical administration, the English Casualty Clearing Station or railhead hospital, introduced into our Tables of Organization, as the Evacuation Hospital, had existed only on paper prior to the World War. It proved to be most effective as a clearing-house for reception and classification of the wounded with reference to stationary treatment or immediate transportation to base. As the war approached its end, and the Allies were able to make advances in the open, the evacuation hospitals were pushed closer up to the front-lines, and eventually centres of *triage*, for sorting out the wounded, were improvised. This device was further helped out by another invention of the Western front, the *barrage* or curtain of fire, behind which the litter-bearers were able to collect the wounded by daylight instead of after dark, with wonderful improvements in the mechanism and speeding up of prearranged evacuation during offensive movements forward.

### *Military Sanitation in the World War*

The success of the Japanese in applying the modern devices of sanitation to the salvage of personnel in the Russo-Japanese War made it self-evident that, in a contest involving armies of millions, neglect of these principles would spell disaster worse than defeat for the unwary. As a matter of fact, the episode of the Western front turned out to be the greatest triumph ever achieved by military sanitation, as shown by comparison with the ravages of typhus fever on the Eastern front, or the effects of the Spanish influenza epidemic of 1918-19, which was relatively more destructive to life than the war itself. With the influenza epidemic, the medical profession was dealing with a phenomenon of almost unknown causation, as had been the Japanese military experience

with beri beri in 1904-5. The medical officers on the western front found themselves confronted first of all with the problems of trench warfare and the diseases consequent upon prolonged exposure to cold, dampness, contaminated soil, filth, lack of bathing facilities and the ever-present possibility of vermin infestation. The Germans, fighting behind a cordon of heavy artillery, in which the Allies were at first deficient, were able to entrench themselves securely behind their third lines in subterranean passage-ways and chambers of solid masonry, which could easily be kept clean; but every soldier who fought in the front-line trenches was predestined to become dirty and also lousy. Delousing therefore came to be an elaborated procedure, a little science in itself, with special stations for bathing and steam disinfection, and by this means, typhus, and eventually trench fever, were abolished from the war-zone in the West. The location of the louse as the vector of trench-fever by English investigators and the conclusive demonstration of this fact by the American Commission was one of the original contributions of the war period. In like manner, smallpox, the typhoidal infections, traumatic tetanus, diphtheria and even the dysenteries were rendered comparatively innocuous through preventive vaccination. The meningitis rate was lowered by vaccination and control of carriers, malarial fever and tuberculosis were kept in hand, and even the rheumatic and gouty disorders were controlled far better than formerly. In the Southern camps in the United States, yellow fever, which might have been a formidable scourge, was non-existent, but in the early stages of the training of drafted men, the infantile diseases, measles, mumps, meningitis, scarlatina, exacted a heavy toll among raw recruits. This was partly owing to the fact that such recruits were often country-bred, from sparsely settled districts and therefore non-immune to diseases to which the city men had been exposed from infancy, but also because most of these diseases are sputum-borne, and can thus be transmitted by the hand. The sputum-borne infections, particularly the pneumonias, remained the insoluble problem of the war. This was less apparent before the onset of Spanish influenza, with its high mortality and its facile transmissoin by hand and mouth infection in the overcrowded cities; but even before this period, it had become necessary to limit the transmission of sputum-borne diseases by segregating contacts and suspects, by swabbing the throats of carriers, by making provisions for increased air-space in barracks (the statutory number of occupants being stencilled on the doors), by employing Grancher's device of making each bed-space in the wards a virtual cubicle, by supervising the cleaning of mess-kits, and by teaching the actual or suspected carrier that his mouth and hands are a menace to society.

The highest incidence-rates of communicable diseases in our forces were those from influenza (729,381 or 228.14 per 1,000), gonorrhoea (220,348 or 68.92 per 1,000), bronchitis (208,592, or 65.24 per 1,000), mumps (195,490 or 21.13 per 1,000), syphilis (54,514 or 17.05 per 1,000), gout and rheumatism (49,505 or 15.48 per 1,000) and tuberculosis (31,106 or 9.73 per 1,000); the highest mortality rates were those from influenza (7.2 per 100) and pneumonia (5.23), the latter being due to the extraordinary malignancy of the pneumonias complicating measles and influenza. The epidemic of Spanish influenza caused 17.33 per cent of total admissions and 8.2 per cent of deaths in the Army. The total number of cases of sickness reported to hospital during 1917-18 was 2,422,362; the total number of deaths from disease, 50,174 (16.67 per 1,000); with the Civil War rates, we should have had 9,759,847 admissions and 227,094 deaths; with the Spanish-American War rate, 6,385,683 admissions and 112,656 deaths. In both wars, there were 200 times as many admissions for typhoidal infections as in the World War, and 100 times as many admissions for malarial fever. These and other data, furnished in the Surgeon General's Reports, show the extraordinary advances made by preventive medicine in the 20th century.

### *Control of Venereal Diseases*

When our forces arrived in France, it was soon perceived by those in command that a high rate of venereal infection would prove a serious handicap to the matter of getting troops into action, not only on account of the effect of such diseases upon the body, mind and morale of the soldier, but also because the number of days lost from duty and the need for segregation from comrades was as great as in the other communicable diseases of grave type. In 1917-18, the Allies' prospects were dark, the forces at the front were well-nigh exhausted from constant fighting, and there was a crying need for fresh personnel. At the base ports of debarkation, therefore, every effort was made to keep the men away from prostitutes and *vice versa*, and although it took some time to convince the port authorities that these efforts were not so much of a religious or ethical order as based upon a definite practical aim, to help them win victories, some *modus vivendi* was at length effected, and a sanitary cordon was established about the ports. When the troops went up to the training areas, the problem became more complex, and this was also true of the training camps in the United States.

In the section for Combating Venereal Diseases of the Laboratory Division, S.G.O., an elaborate program was blocked out and carried into action, comprising (1) the use of prophylactic measures where necessary; (2) coöperation with the Public Health Service in the control of extra-cantonment areas; (3) education of the soldier in regard to the meaning and purpose of his sexual nature, the consequences of venereal infection and its effect upon his descendants and the fact that continence is nowise injurious to health but possible to every well-balanced individual; (4) appeal to his better nature by means of pamphlets, lectures, personal talks, moving-picture scenarios, etc. In spite of these efforts, the incidence-rate of gonorrhoea during 1917-18, as seen from the above figures, came second, and that of syphilis seventh, in order of magnitude among the communicable diseases affecting our troops. Of 259,621 cases of venereal diseases reported in 1917-18, in an army of 3,361,848, about 196,000, or nearly two-thirds, were brought into the army

from civil life, the remaining 62,612 being cases contracted after enlistment or which had escaped detection before enlistment. The venereal admission rate among negro troops was seven times that of the white and among Southern troops, who showed a higher venereal rate than in troops from other parts of the country, the negro rate was four times that of the white. Ashburn's analysis of venereal statistics in the Army during 1918<sup>7</sup> shows 133,203 cases introduced from civil life out of 196,008. The incidence-rate of cases contracted after enlistment (62,805) was 45.46 per 1,000, and of these 5,024 were negro, 57,781 white. There were, therefore, 65,242 venereal cases brought in from civil life by 2,023,945 whites (3.22 per cent) and 67,961 cases brought in by 325,548 negroes (20.87 per cent) at the ports of embarkation. Such infected troops were segregated and not permitted to go overseas, yet the infection rates at home and abroad were about equal. During the five years 1912-16, however, the rates of venereal infection in troops stationed in the United States were 93 per 1,000 for whites and 105 for negroes. The rate of venereal infection of drafted men in 1918 (56.69 per 1,000) thus lowers the earlier rate by one-half. The high venereal rate among men from the civil population is to be attributed in part to the increase in sexual promiscuity and laxity of morals in our over-crowded cities under war-time conditions, and to the fact that immunity from venereal infection, even after exhibition of the newer parasitocidal remedies, is illusory. Among all strong peoples of the past, *potentia generandi* was exalted above *potentia coeundi*, as shown by the deification of the generative powers in nature, even by savage races. The swaggering bravos in the Elizabethan plays did not boast of their amours but of the number of lusty children they were capable of begetting. The Greek gods in Hesiod and Homer were of the same mind. The artificial sterilization of marriage by chemical and other contraceptive measures, has, as Bernard Shaw affirms, effected a complete revolution of opinion, as shown by the literature, art and some of the social customs of the present hour. It is no exaggeration to state that our period is saturated with sexuality. The "furtive, retiring sensuality" which Lecky attributes to the northern races has given place to a spirit as cynical and forward as that of the Latins, in whom no Freudian complexes exist. The American is perhaps saved, in some measure, by his irrepressible sense of the comic. The appeal to the enlisted man is simple: You are a responsible member of society. If you become infected with venereal disease, you may ruin not only your own health, but that of your descendants. The time is approaching when society will deal with your case publicly, as it does with diphtheria or small-pox or leprosy. It is up to you.

The World War left continental Europe in a desperately demoralized and distracted condition, with the necessity of creating a new social order or of wallowing indefinitely in the slough of despond. The peace did not make peace, as shown by the map and the unsettled state of Eastern Europe, and the European War itself indicates that war waves, which formerly moved from north to south, now tend to move from east to west. Internationalism, the socialization of the world, with armies and navies doing police duty for the common good, is the dream of all advanced and enlightened spirits, but implies a world-wide social order, more open-minded and tolerant, better tempered, better disciplined, better educated by experience than any existent at the present time, when the "Red" Army of communal Russia is the largest in Europe.

<sup>7</sup>P. M. Ashburn; MILITARY SURGEON, Washington, March, 1920, xlv, p. 328.

As our country swings back to normal, let us hope that our people will begin to realize that wars are biological phenomena, that armies such as ours exist to stabilize society and to maintain peace, that "to steal away a nation's sword is to be the surest enemy of peace" (Novalis). The principal lesson we have learned from the European War is unquestionably that to attempt to prepare for a war of magnitude in unit time is a wasteful and extravagant procedure, the cost of which is ultimately borne by the people, and that without reasonable preparedness, we may be again caught napping, and like other Anglo-Saxon countries "go through the sad probation all again." Our Army has been likened to the fire department of a large city: in periods of quietude, its very existence (little as this fact is realized) helps to stabilize the social order into a sense of security; in time of emergency, it is there to put out the fire. Preparedness means preparedness to maintain peace as well as to make war. Wars of the future are likely to be of even more destructive character than the World War; the possibilities of using chemical, electrical and pathogenic agents are already vaunted, and in such wars, the services of the Medical Department will be of even greater use and value. In the words of Taylor:<sup>8</sup>

"The world was far from even apprehending what it has yet to learn thoroughly, that in the field, the distribution of medical supplies, prompt evacuation, skillful first aid, shelter, food, and restoratives available early for every fallen combatant are of infinitely more importance than highly technical relief to difficult cases. More critical still are the problems relating to later demobilization, to hospitalization and rehabilitation of war victims, and the faithful but well-ordered and economical relief of the wreckage of war. Millions will be spent and more millions wasted until the time comes when it is a recognized part of the program of national defense to organize methods of post bellum relief at the same time that activities are initiated for the prosecution of hostilities. We have progressed from the day of medical attendance for leaders to medical attendance for all combatants, and leaders are increasingly alive to the immediate necessary needs of their forces; but we have not yet attained to a comprehensive grasp of the requirements or possibilities of military medicine."

<sup>8</sup>J. S. Taylor: *United States Naval Medical Bulletin*, Washington, 1921, xv, No. 3.



Annual Meeting at Washington, D. C., October 12, 13, and 14, 1922.  
Sessions to be held in the auditorium of the Interior Department.

# *The Military Surgeon*

*Published monthly and constituting two volumes annually.  
Volumes commence with the January and July numbers.*

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Entered as second-class matter January 22, 1916, in the Postoffice at Washington, D. C., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917; authorized July 2, 1918.

Subscriptions \$4.00 a year for the United States. Elsewhere throughout the world \$4.50. Single copies 50 cents. Subscriptions payable in advance. Checks should be made payable to The Association of Military Surgeons, U. S., and not to any officer personally.

*The addresses of members and subscribers are not changed except upon request. In every case the old as well as the new address should be given. Requests for change of address must reach the Secretary before the twentieth of the month to be effective for the following issue.*

Original articles, items of news and matter of interest to the Services are welcomed. Requests for reprints should be made at the time of forwarding articles.

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## “'IDDLETON TO 'OSES”

Some years ago a foolish story ran as to the social aspirant who, desirous of social recognition, claimed as a Middleton his descent from Moses, on the ground that it was perfectly simple to drop the “oses” and add the “iddleton.” Moses, in the days of the Prophets, was a man to be revered and considered. Middleton represents a fair proportion of our nowadays population.

In the Civil War, Letterman stood out as an apostle of the preparedness which has been so much discussed as an ajoint of our recent war-time years. It seems to us that we medical citizens have more to do than drop the “iddleton” in order to subordinate ourselves usefully to the state.

We have been ready to scoff at things military, to undervalue the worth of military training. Have we in this attitude been altogether consistent and altogether in accord with the policies which make for the assurance of national safety?

The medical officers of the French Army are required, or were required, under pre-war conditions, to serve, after matriculation at the school at Lyons, for one year as soldiers of the line. In this service there was nothing of the attributes of the medical profession; the training was purely military. At the end of this time, they resumed their medical training, having attained a non-commissioned grade not higher than that of sergeant, but they had a thorough working knowledge of the military machine. When they had completed the intensive course of instruction and the additional clinical teaching at Val de Grace



hospital, they were commissioned in the Medical Corps of the army of France and sent forth to fulfill their mission as medical officers.

We are approximating that today in our Army Medical School and we are sending out for the care of the line men who are infinitely better instructed in their duties than in the somewhat haphazard teaching of bygone years.

Nevertheless, it is still a step from Moses to Middleton. Everyone today shrieks aloud the fact that there will be no more war. Maybe so, but that seems to be contrary to the records of history so far as we have been able to read it. Therefore, why should we be Middletons deriving by devious methods our ancestry from Moses? The fact remains that *we are* Middletons; the fact remains that there is a possibility that at any time in the near future we may be called upon to be not only passive, but very active Middletons.

If we desire to make good our claim on the ancient ancestry, why not avail ourselves of all the aid which may make us more perfect in this, our profession?

At present the Government, our Government, is offering to those who wish to specialize in the line of military medicine, an opportunity to attain a certain amount of facility in a highly specialized branch. Jack Smith, M.D., is a good doctor in his own civil circuit. Diphtheria, scarlet fever, pneumonia, have no terrors for him but, if the national safety demands that he throw aside his routine practice and put on the uniform of his country and assume the obligations which that uniform demands, he may find the requirements embarrassing.

That being so, why not so arrange things so that when the call comes to us as individuals and as units of the nation, we shall be prepared to carry out the duties which are manifestly ours to perform? Under much reduced circumstances the Government has instituted camps of instruction dedicated to this purpose.

Certain men with a prophetic eye of the future will go to these camps, will profit by the instruction there given and fit themselves for what duty may—or may not—eventuate in the case of further aggressive wars against the United States. Others will not.

It is not necessary to indicate those who will be of most service to the state under the conditions quoted. The man instructed, thoroughly familiar, not only with his professional problems but also with the administrative questions which arise as an inevitable concomitant of medico-military service will of necessity take precedence over him who believes that professional excellence, minus military training, will fulfill every necessity.

So far as is consistent with the appropriations by Congress this year,

courses of training have been supplied for the teaching of medical men in things military. Whether this offer by the Federal Government has been fully accepted is open to doubt. It is very well worth consideration as to whether the shunning of this application, the neglect of the opportunity to perfect one's self as a military surgeon as well as a civil surgeon or practitioner is justified.

Is it not the duty of each of us, of all of us, to so school ourselves, to so fit ourselves, that in the event of any national crisis we may be ready to step forward and offer ourselves fit in every way so far as our capabilities go, to meet the necessity?



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## BOOK REVIEWS

**THE THYROID GLAND.** Clinics of George W. Crile, M.D., and Associates at the Cleveland Clinic, Ohio. 8°. 228 pages, with 106 illustrations. Philadelphia and London: W. B. Saunders Company, 1922.

It is stated in the introduction that this book is "but an ephemeral publication and does not purport to be a textbook or a monograph." None the less it is a very clear and concise treatise on the normal physiological function of the thyroid, its diseases with their diagnosis and complications, the prevention of such diseases, and their treatment both by the Roentgenray and by operative surgery. It is not a contribution to the subject of endocrinology in general, since it confines itself strictly to the thyroid and avoids discussion of the relation existing between the internal secretion of this and the other ductless glands. One exception to this rule—more apparent than real—is a brief mention of hypopituitarism which, after all, is of the nature of differential diagnosis rather than of endocrinologic discussion. The Roentgenologic diagnosis of goitre, the value of basal metabolism studies, and the prevention of simple goitre are treated somewhat *in extenso*; but one-third of the book is given up to the operative surgery of the thyroid gland in detail. The work may thus be said to be intended more especially for the operating surgeon, and for him it constitutes a very valuable addition to the literature of this subject.

The printed text is throughout richly illustrated with photographs, Roentgenographs, and diagrams illustrative of each phase of the subject. Especially noteworthy are the diagrams and Roentgenographs illustrating the chapter on "The rôle played by the radiologist in the diagnosis of goitre," and the illustrations showing the details, not only of the operative technique, but as well of the preparation of the patient and the operating room in goitre surgery. All in all this volume should come to be one of the most generally useful works for quick and ready reference which has yet appeared in American medical literature on the subject.

A. N. TASKER,

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**THE PRACTICE OF MEDICINE**, by A. A. Stevens, M.D., Professor of Applied Therapeutics in the University of Pennsylvania; Professor of Therapeutics and Clinical Medicine in the Woman's Medical College of Pennsylvania. 8°. 1,106 pages. Philadelphia and London: W. B. Saunders Co., 1922.

At last, after thirty years, Dr. Stevens' "Manual of the Practice of Medicine prepared especially for students," for so long dear to the hearts of those same students in the hour of desperate need, has come to mature estate; though it is not by this intended to suggest or imply that the book here under review is merely a glorified manual. Far otherwise. Beginning quite conventionally with the "Infectious Diseases" (subdivided into infections due to bacteria, to protozoa, to filterable viruses or of doubtful etiology, fungus infections, and metazoan infections), the book further treats of "Intoxications," "Food Deficiency Diseases," "Disorders of Metabolism," "Diseases of the Digestive System," "Diseases of the Respiratory Tract," "Diseases of the Circulatory System," "Diseases of the Kidneys," "Independent Diseases of the Bloodforming Organs and the Anaemias," "the Hemorrhagic Diseases," "Diseases of the Spleen," "Diseases of the Ductless Glands," "Diseases of the Joints and Bones," "Diseases of the Muscles and Myopathies without obvious changes in the Nervous System," "Diseases of the Nervous System," and "Disorders due to Excessive Heat."

The treatment of "Focal Infection" is particularly well balanced and conservative. The author avoids giving offense to the instinct of possession of both protozoologists and

bacteriologists—without leaving any doubt as to the side of the fence upon which he himself may be found—when he declares of *Spirochaeta pallida* that “it is more closely related to the protozoa than to the bacteria.” Respectful consideration is paid to *Cytoryctes variolae*, but the statement that “the infecting agent of smallpox has not been isolated with certainty” is very unequivocal. The last sentence of the paragraph on the etiology of pellagra to the effect that “the weight of evidence favors the view that pellagra is a nutritional disease resulting from the lack of proper food balance” is calculated to raise protesting voices in certain quarters; but on the other hand it may fairly be assumed that the number of champions will be at least as great, if not greater. Dr. Stevens is no straddler. The mosquito concerned in the transmission of yellow fever is several jumps ahead of the author in the matter of zoological nomenclature, but these jumps are so numerous and frequent that it is hardly to be wondered at that many of them escape the notice of all persons other than entomological specialists. Since discarding the name *Stegomyia calopus*, this mosquito has masqueraded under a number of other aliases and is now passing itself off as *Aedes aegypti*. However, the old name, *Stegomyia fasciata*, still the designation applied by Old World entomologists, has been so long and so firmly established in medical literature and is so well known to all physicians that it seems advisable from a practical point of view to continue its use in medical writings. The section on diseases of the nervous system is as nearly “human” as any piece of writing relating to that subject could possibly be. It has been composed not for the neuro-psychiatrist, but for the internist, who must needs know when to summon the other specialist or must be able to find quickly the fundamentals of diagnosis and treatment when such consultation is not available. In this particular, the book offers something to the general practitioner that hardly any other text book on the practice of medicine affords.

This work, dedicated to the memory of Sir William Osler, whose influence on medical writing and medical education in the United States has been so predominant, is *sui generis*. Its perusal gives a very definite impression of the good fortune enjoyed by those medical students who sit under Dr. Stevens' clinical instruction. It is very plain that the student of medicine has at no time been forgotten, and the book is as much intended for his needs as was the first edition of “A Manual of the Practice of Medicine” written by the present author in the earliest days of his own professional career. All the essentials of all the “new stuff” are here. Concise, yet sufficiently detailed, descriptions of such technical methods of diagnosis as the tuberculin test, the Schick test, Lyon's transduodenal drainage of the biliary tract, electro-cardiography and sphygmography, are, like all the others, found in their appropriate places. Again, it has not been forgotten that the practitioner (as well as the student) desires not only help in diagnosis, but in treatment as well; and approved methods of therapy are an important feature of the discussion of each disease. All in all, this new “Practice of Medicine” occupies a place peculiarly its own and heretofore unfilled in the medical literature of America. The modest claims set forth in the preface have been more than made good, and the book will add materially to the facilities available for medical education in this country.

A. N. TASKER,

Major, Medical Corps, U. S. Army.

## BOOKS RECEIVED

Books received are acknowledged in this department and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interest of our readers and as space permits.

ETUDES NEUROLOGIQUES by Georges Guillaín. Masson et Cie, Editeurs, 120 Boulevard Saint Germain, Paris, France. 1922.

NOUVEAU TRAITE DE MEDECINE. Vols. II and V. Masson et Cie, Editeurs, 120 Boulevard Saint Germain, Paris, France.

LE PROBLEME DU CANCER by Wm. Seaman Bainbridge, A.M., Sc.D., M.D., C.M., LL.D. The Macmillan Company, New York.

THE SURGICAL CLINICS OF NORTH AMERICA. June, 1922. Vol. 2, Number 3. Philadelphia and London: W. B. Saunders Company.



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Rochester, N. Y.

# THE MILITARY SURGEON

VOL. LI

SEPTEMBER, 1922

NUMBER 3

## A PROPOSED NEW STANDARDIZED FIELD CARRYING DEVICE FOR THE INDIVIDUAL EQUIPMENTS OF THE MEDICAL DEPARTMENT, U. S. ARMY, FROM A STUDY BY THE MEDICAL DEPARTMENT EQUIPMENT LABORATORY SUBMITTED TO THE SURGEON GENERAL OF THE ARMY

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(With five illustrations)

VERY shortly after entering the Medical Corps of the Army I was impressed by a very apt figure of speech of which I heard a prominent senior officer in the corps make use, wherein he likened the Medical Department of the Army to a complex organic chemical compound, in which the basic atom was the first-aid packet, the simplest molecule the hospital corps pouch, with other increasingly complex molecules represented by the detached service chest, the ambulance company dressing station, the field hospital, and so on. The figure struck me very forcibly at the time and has recurred to me frequently in the years that have intervened. Quite in accord with a logical method of procedure suggested by this figure of speech, one of the first projects undertaken by the Equipment Laboratory after its organization was the attempt to improve the first-aid packet, which, when completed, provided a rational basis upon which the next project, viz.—the revision of the individual equipment of the Medical Department's personnel—could be undertaken. In other words, having determined the size, weight and contents of the atom, our next step was to group this atom with others to form the simple molecules.

Since first aid, in so far as material is concerned, is largely dependent upon the first-aid packet, it seemed logical to build up from the first-aid packet the individual equipment of the various elements of the Medical Department. Beginning, therefore, with the simplest grouping of first-aid material—that is, the

equipment of the private and private first class—the Medical Department Equipment Laboratory then passed on to the equipment of noncommissioned officers and then medical officers, as being apparently the most logical order in which these steps could be taken, since it appears obvious that the equipment of the noncommissioned officer should be based, not only on the function of the noncommissioned officers but upon definite knowledge of what the private or private first class would have available on his person. The same is true of medical officers. The equipment of the personnel of a medical detachment being determined in variety by the items on both privates and noncommissioned officers, and in quantity by the number of privates and noncommissioned officers allowed by tables of organizations to each unit to which they are attached, the equipment of the medical officer can be figured to apply not only to his own function but to supplement material reasonably sure to be available to his use on the persons of his subordinates. It follows that, with the individual equipment of the personnel of the medical detachment thus determined, the next logical step will be the development of the simplest unit equipment based on the reasonable assurance of material available upon the persons of the personnel attached. With this general scheme in mind and with the first-aid packet as the basic atom, our work started with the development of the individual equipment of the private and private first class, Medical Department.

Very early in our study of this equipment it occurred to us that it would be highly desirable if, in addition to revising and improving each set of individual equipment—that is, equipment of the private and private first class, noncommissioned officer, medical officer, etc.—some standard unit of equipment could be designed which would be applicable to all of the personnel of the Medical Department, rather than to continue, even though improved, the wide variety of units now authorized. We have at present for the private the medical department belt; for the noncommissioned officer the emergency case; for the medical officer the medical officer's belt; for the dental technician, dental case B; for dental officer, dental case A; for the veterinary officer the veterinary officer's wallet; and while no definite equipment is at present provided, it is assumed that the noncommissioned officers of the veterinary service are to carry the so-called "farrier's wallet," while the equipment to be carried by the private of the veterinary service is still undetermined. Therefore, for the individual equip-



ment of the Medical Department we have now seven separate and distinct types of field-carrying device with the necessity for another one facing us, that is, one for the private of the veterinary service. It seemed to us so obvious that a great step in advance would be made if, instead of these eight types of field-carrying device, we could produce one standard unit capable of such grouping or modification that it would be applicable to the three services and the three grades.

Since the standard infantry pack was authorized for all dismounted troops, it is necessary, in order to use this pack with the present Medical Department belt, to eliminate the contents of the two middle pockets in the back, in order to permit this pack to ride down against the soldier's back and not be held away from his waist by these pockets when full. This, of course, eliminates four individual dressing packets from the equipment of the private, and since this belt is a fixed unit without any possibility of emergency expansion in so far as its contents are concerned, the desirability of incorporating emergency expansion in any piece of field carrying equipment was strongly impressed upon us. Naturally in considering individual equipment for a soldier, the primary factors which must constantly be kept in mind are weight and its distribution and method of carriage.

Within recent years the Medical Department has used a pouch carried by a sling over one shoulder and also a belt worn around the waist. With the pouch the weight was all placed on one shoulder, making a one-sided load. With the belt the weight was all supported from the hips and around the waist, making an uncomfortable device to carry, in addition to which, the pockets on the sides of the belt held the arms out from the hips, producing added discomfort in marching. It was our aim at first, therefore, to do away with these undesirable features. From personal experience with the standard hunting coat with its shell pockets in front of the hips on either side, it occurred to me that this was, perhaps, the most comfortable position in which a load could be carried without interfering with the arms, without restriction of the chest or waist and with the actual support placed over the shoulders and across the back. I have tramped all day with from twenty-five to fifty 12-gauge shotgun shells distributed between these shell pockets without undue fatigue or discomfort. The matter of dividing the load into two equal halves therefore suggested itself.

As to carriage, a coat would be an impracticable military proposition, yet in this hunting coat the essential part concerned in the carriage of shells consisted in strips over the shoulders and a yoke at the back of the neck. This immediately suggested the common application of this principle, the ordinary pair of suspenders with which men have supported their trousers for many years. We therefore developed a suspender made of heavy duck, so designed that it would fit closely into the neck, would cover at least  $2\frac{1}{2}$  inches of the clavicle on each side, would be joined with a yoke between the scapulae and so constructed that it would retain its original shape. It was made of two pieces of water-proofed cotton duck so cut that the pull on the shoulder straps would be directly on the warp threads. These two pieces join together at the mid-line in the back to form the yoke, allowing a small triangle from each side to run bias of the goods, thus permitting just enough spring so that the yoke will conform to either a convexity or concavity between the scapulae. From this suspender we hung a pouch on either side.

The next factor to be worked out was, of course, the size of the pouch, the idea being to develop the maximum sized container that could be carried with comfort, and then determine the load which could be carried in this container, weight and distribution of weight being carefully considered at all times. It was found, after repeated experiments, and after trying out eleven different sizes and shapes and types of construction, that about the maximum container that could be carried in this way would be a pouch  $2\frac{1}{2}$  inches thick,  $8\frac{1}{4}$  inches long and 6 inches deep. These figures were not arrived at haphazard, and a pouch of 9 inches could, in all probability, have been carried as comfortably as an  $8\frac{1}{4}$ -inch pouch, but the  $8\frac{1}{4}$ -inch pouch will carry eight first-aid packets, side by side, or two stacks of five first-aid packets, end to end. If the 9-inch pouch had been used, it would not have carried nine first-aid packets; another  $\frac{1}{4}$  inch would have been necessary, making a pouch  $9\frac{1}{4}$  inches, and then, if this  $9\frac{1}{4}$ -inch pouch had been filled with first-aid packets, it would not have packed as economically as the  $8\frac{1}{4}$ -inch pouch, since only one more packet could have been added for the extra inch.

The matter of weight was also taken into account. The pouch,  $8\frac{1}{4}$  by  $2\frac{1}{2}$  by 6 inches, which will carry ten first-aid packets of either the new or old type, was taken as the basis of experiment. This was all very well as a starter, but it permitted no crisis ex-

pansion. This we believe highly desirable and so we made this pouch not 6 inches but 12 inches deep. We then stitched along both sides of the pouch, so that the stitch line would come 6 inches below the top, two strips of canvas  $1\frac{1}{2}$  inches wide, in the free edges of which we placed eyelets which would register with each other—that is, the eyelets on one strip will register with eyelets in its fellow on the opposite side. By turning this pouch-bottom outside in, these strips of canvas can be laced together, the extra material constituting the bottom of the pouch can be tucked down against the lacing strips so that the result is actually a pouch 6 inches deep, but one which, by simply removing the lacing, can be converted into a pouch 12 inches deep—in other words, 100 per cent emergency expansion. This pouch, then, in the normal position—that is, with the bottom folded in and the strips laced together—will carry ten first-aid packets. The same pouch, with the lacing removed and the bottom expanded, will carry twenty-four first-aid packets.

We then produced two of these pouches, attaching them with “D” rings hung from the upper rear angle to snap hooks on the suspenders. In this position, loaded with first-aid packets, they will carry fairly well, but without some means of joining them front and back they will be unstable—that is, they would flap and have a tendency to slip off the shoulders. So on one “D” ring of each pouch we placed a small swivel snap hook which is connected to the “D” ring of the opposite pouch, so that these two pouches are brought to within approximately  $2\frac{1}{2}$  inches of each other in front of the wearer’s waist. We then joined the rear “D” rings of these pouches by means of an adjustable webbing strap with a snap hook on each end, which strap passes from the rear “D” of one pouch around the small of the wearer’s back to attach to the rear “D” ring of the opposite pouch. This strap and the swivel snap hook connecting the pouches in front, make, in effect, a loose belt. This belt supports no weight but serves merely for the purpose of holding the pouches in to the waist to prevent the suspenders from slipping off from the shoulders in front, and to prevent the whole load from falling off when the wearer bends forward from the waist.

Now this arrangement does very well for marching troops, but the Medical Department soldier must travel with mounted organizations, and such a pack would be very uncomfortable when riding a horse. We found, however, that this strap which we used

to join the two pouches across the small of a man's back, could also be used to hang one pouch from the cantle ring of a standard saddle. We therefore attached a small canvas loop to the back of this pouch through which the middle saddle bag latch strap can be passed before engaging its buckle. With this pouch suspended by means of this strap and prevented from shifting by means of the saddle bag latch strap, it becomes an integral part of the saddle bag. This equipment is therefore adapted to mounted service. Since there are two of these pouches, two straps must be provided. So a second one was added which, for dismounted service, is carried connected to the two "D" rings of one of the pouches. We thus have, as the basis of this equipment, a pouch and a short strap and a pair of suspenders. The short strap we have termed the cantle ring carrying strap, because, in addition to supporting the pouch from the cantle ring, it can be adjusted to make a hand strap by means of which the pouch can be carried as a hand satchel.

Having thus two pouches exactly alike, we next proceeded to work out the contents and, since one pouch carries conveniently ten first-aid packets, we used the other pouch to carry the other necessary equipment needed by the private. This equipment consists of one book of emergency medical tags, one lead pencil, a flask of aromatic spirits of ammonia, two Robinson tourniquets, a linen instrument case containing dressing forceps and scissors, two dozen safety pins, one dozen compressed bandages, three triangular bandages, one 5-yard spool of 1-inch adhesive plaster and one dozen iodine swabs. It was found that the emergency tag book would go conveniently in the pouch with the first-aid packets, and, as the pencil should be kept with this book, we put a loop on the under side of the lid of the pouch to carry the pencil.

In order that the necessary equipment of the other pouch could be packed conveniently, we made an insert of heavy duck upon which we mounted three loops, one loop to carry the flask of aromatic spirits of ammonia and the other two loops to carry each a Robinson tourniquet. This insert is attached to a small lip of canvas attached to the inside of the back of the pouch near its top and which has mounted in it five eyelets which register with five eyelets similarly placed in the top of the insert, so that this insert may be readily removed or easily laced into the pouch as required. We also placed another loop on the inside of the lid of the pouch to carry the linen instrument case, and believing

that it might be desirable sometimes to wear this pouch on a waist belt, we placed two canvas loops to run vertically on the back of the pouch, through which an ordinary waist belt can be passed so the pouch can be worn on the belt. Each pouch then consists of a canvas container which, in the normal position, is 6 inches deep,  $8\frac{1}{4}$  inches wide and  $2\frac{1}{2}$  inches thick, which has on its back three loops, two to adapt it to the waist belt and the third to engage the saddle bag latch strap; on its end two "D" rings for attachment to the suspenders or the canteen ring carrying strap, one of these "D" rings equipped with a swivel snap hook to join the two pouches together. The lid of the pouch is held closed by means of a chrome leather strap and roller buckle. Inside of the pouch, on the under side of the lid are two loops, one for a lead pencil or clinical thermometer and the other for the little instrument case, or a hypodermic syringe. At the junction of the back wall with the top, or the hinge of the top, is a lip of canvas extending across the pouch in which are set five eyelets to which may be laced the insert.

To our private, therefore, we would issue two pouches, two canteen ring carrying straps and one insert. Now, since the webbing straps which constitute the tails of the suspenders require some lateral movement they were attached to the suspender by means of a steel ring so that on the end of each of the front pieces of the suspender is a ring, and two similar rings on the yoke, and since, from the construction of the suspender, it occurred to us that it would make a splendid basis for a harness upon which litters could be carried, we produced a webbing strap 4 feet long with an adjustable sliding buckle equipped with a snap hook at each end. By using two of these straps, attaching one end of each strap to the rings on the front of the suspender and the other ends of these straps to the back of the yoke of the suspender, they form loops the depth of which can be adjusted to the length of the wearer's arms, and when so adjusted they form a litter sling with which the weight, instead of being carried around the back of the bearer's neck, is distributed over both shoulders and across his back. So comfortable is this device for this purpose, and so superior to the present type of litter sling, that we decided to incorporate a pair of these litter straps in the equipment, even at the expense of some other item, and since the item which probably could best be spared, in view of the crisis expansion available, was the first-aid packet, we took out two of those first-

aid packets from the left-hand pouch and put in two of these litter straps, so that the left-hand pouch finally contains two litter straps, eight first-aid packets, a book of emergency medical tags and a lead pencil.

Now these litter straps have still two more functions. First, in addition to forming, with these suspenders, a superior litter sling, each strap can be used as a shoulder strap to carry one individual pouch, thus converting our pouch into a sort of haversack or musette bag to which the litter strap performs the function of the old canteen-haversack strap. Under certain conditions our private must furnish the motive power for a two-wheeled litter carrier, which carries two loaded litters, and in order that this motive power may be applied as near the axles of this vehicle as possible, there has heretofore been provided, as a part of this vehicle, a sort of webbing dog harness through which the soldier slipped his head and applied traction from his shoulders to the vehicle. By removing the pouch from the suspender, by connecting a pair of litter straps to the snap hooks at the front and rear of the suspender, by taking one cantle ring carrying strap and connecting it across the front rings of the suspender to form a breast strap, this dog harness for this wheeled litter carrier is replaced by the equipment already on the soldier, except for one short piece of heavy webbing equipped at one end with a cock-eye and two rings and at the other end attached permanently, or with a heavy snap hook, to the vehicle. So, instead of having this vehicle lumbered up with cumbersome and not very comfortable harness, this small piece of webbing with the cock-eye and rings can be attached to it permanently, without being in the way at all, and any soldier equipped with this equipment can be harnessed to this cart quickly and without difficulty. In actual test the harness thus made will stand any tug that can be exerted upon it by a soldier.

We have, then, as the elements of this equipment:

First, the suspender. This suspender serves not only to carry the pouch, but forms a basis of a litter sling and the basis for the dog harness for pulling the two-wheeled litter carrier.

Second, we have a pouch which is capable of carrying ten first-aid packets in the normal position, that is, in the ordinary position in which it would be most frequently used, but which can be expanded by the simple removal of a lacing, to carry twenty-four first-aid packets. This pouch is equipped with loops to be carried on a waist belt, or Sam Browne belt, with a loop to hold it to the latch strap of a saddle bag, with a loop on the under side of the

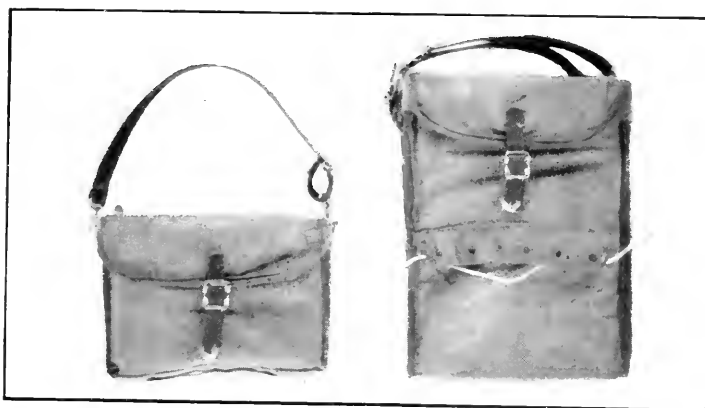


FIG. 1.—Showing pouch in the normal and the emergency position. In the normal position as shown the pouch will hold 10 first aid packets and in the emergency position it will hold 24.

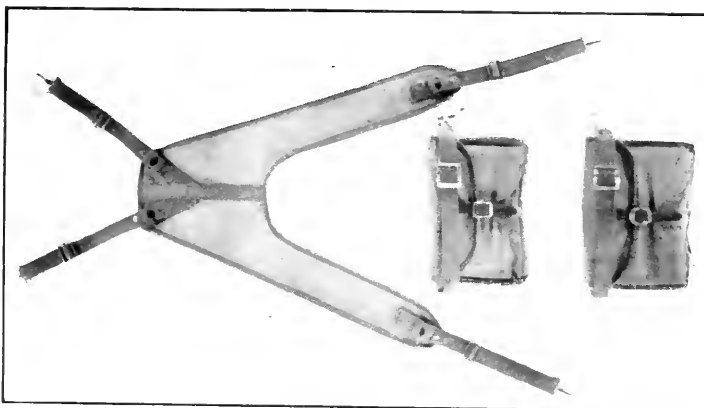


FIG. 2.—Showing the suspender and the two pouches, each pouch being equipped with cattle ring carrying strap; the litter straps are substituted for two of the first aid packets in the left hand pouch.

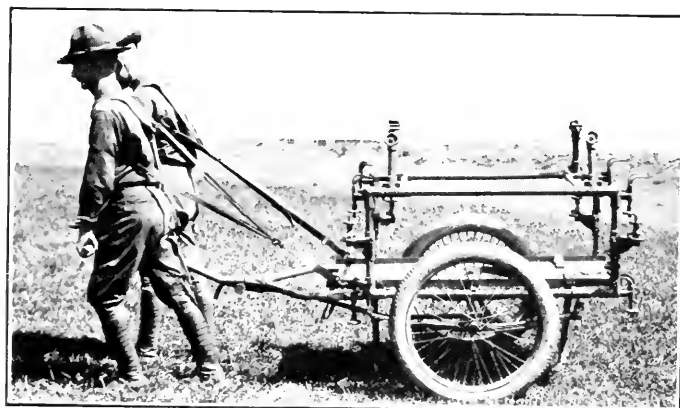


FIG. 5.—Showing the suspender and litter straps used as a harness for the field litter carrier. The man in the foreground is equipped with the new suspender and litter straps; the man in the background with the heavy webbing harness at present a part of the equipment of this litter carrier.

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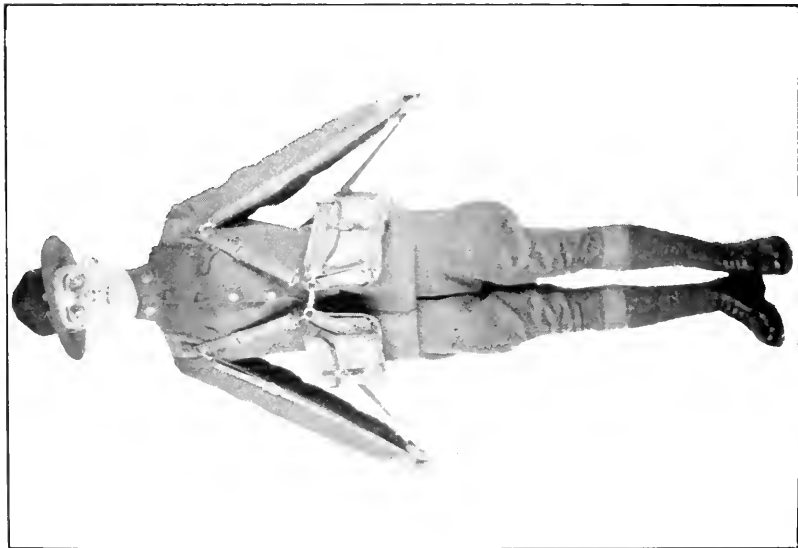


FIG. 3.—Showing the pouches worn with the suspender to which is also attached the filter straps.

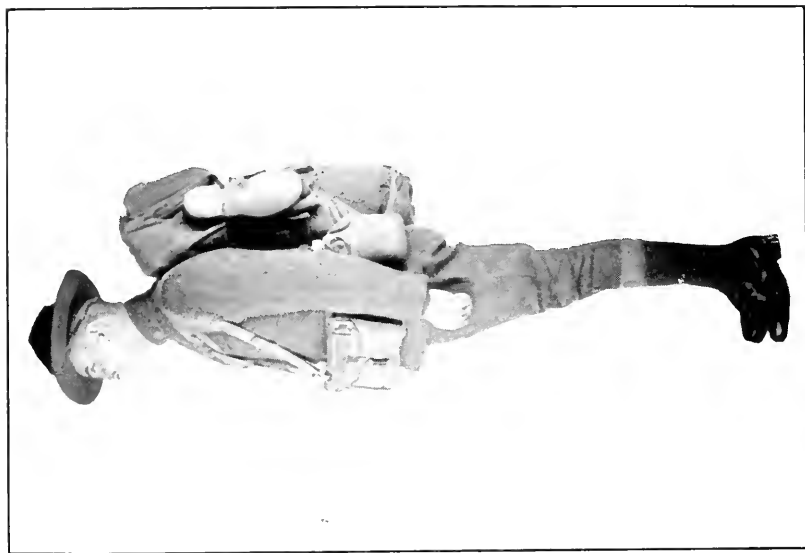


FIG. 1.—Side view, showing the position of the pouch, the soldier's arm, the canteen and the standard pack.



lid to hold a hypodermic outfit, instrument case or a dental hypodermic, a loop on the under side of the lid to carry a lead pencil or clinical thermometer, and a lip on the inside of the back to which may be attached an insert.

Third, with each pouch goes one cantle ring carrying strap. This may be used as a hand strap to carry the pouch as a hand satchel, it may be used to carry the pouch from the cantle ring of a saddle; when two pouches are worn one of these straps is used to make up the rear sector of the belt over which the infantry pack is worn, or, when the dog harness is used one of them becomes the breast strap.

Fourth, we have the litter straps. These may be used to form, with the suspender, a litter sling. Each litter strap may be used individually as a canteen-haversack strap to carry a single pouch suspended from either shoulder, or, when the dog harness is used, they become the traces of the harness, and,

Fifth, the insert. This is a canvas back on which are mounted loops. For the private the insert forms a part of his equipment and carries the aromatic spirits of ammonia and two Robinson tourniquets.

While we were on the equipment of the private, the cardboard box containing the six iodine swabs which is now issued seemed capable of improvement; we therefore devised a tin can with a felt pad top and bottom and a hinged cover, which will contain twelve iodine swabs and occupy less space than two boxes containing six swabs each. We also had the triangular bandage compressed and packed so that three bandages, side by side, could be placed across the length of the pouch, and instead of using the heavy unbleached muslin triangular bandage, hemmed and bound with tape, we went back to the old Esmarch bandage with figures illustrating its use printed upon it. The total weight of this equipment for the private, including the carrying devices, is but 7 pounds 1 ounce. Properly adjusted, it can be worn with great comfort with no constriction of the chest, no pressure upon the abdomen, no traction upon the waist. The arms can be brought in to the waist. In swinging naturally, when marching, they do not hit the pouch and the infantry pack put on over the suspender will ride right into the carrier's waist, where it is intended to go.

There still remain the soldier's canteen and his individual first-aid packet. As to the first-aid packet, we are inclined to believe it is unnecessary as a part of the equipment of a man who is already carrying a minimum of eight, and who is further equipped with

adhesive plaster, three triangular bandages and one dozen 5-yard compressed bandages. So that the webbing waist belt with which we propose to equip the private, besides being worn for ceremonies, etc., will carry only one canteen. We believe, however, that a suggestion made by Col. Jas. S. Wilson, M. C., that two canteens of water be carried by the medical soldier, is excellent, and on our waist belt we mounted two canteens so they would ride just back of the trochanters. This left sufficient space between the two canteens behind for the infantry pack, without any possibility of interference, and ample space between the two canteens and the rear ends of the medical pouches for the soldier's arms to be brought in to his waist. But actual experiment proved that these two canteens when filled with water weighed  $3\frac{3}{4}$  pounds each, and when mounted in this position produced a very uncomfortable pull on the front of the abdomen. We then built two small webbing straps with snap hooks on each end, which can be snapped at one end into eyelets in the waist belt just above each canteen, and snap at the other end into the rear rings on the suspender. These straps, therefore, transfer the weight of the two canteens full of water from a pull backwards and downwards on the anterior abdominal wall to a direct pull downward from the shoulder, which is, in turn, counterbalanced by a pull downward on the front of the suspender, by the medical pouches.

With the infantry pack worn over this suspender, the straps attached to the shoulder straps of the pack, instead of engaging this waist belt, are attached to the front "D" rings of the two pouches, so that these pouches help to counterbalance the weight of the infantry pack as well as counterbalancing the weight of the two canteens. In this way the entire equipment is suspended from a man's shoulders without in any way constricting his chest, compressing his waist or dragging on the front of his abdomen.

Believing this to be a satisfactory equipment for the private we then attempted to adapt the units of this equipment to the other grades and the other services. We found, after experimenting, that this could be done. Two of these pouches would carry what we wanted to put on the noncommissioned officer, the only change being the substitution of a different insert for the insert carried by the private. We found that one of these pouches equipped with the same insert for the noncommissioned officer and one litter strap would carry all of the equipment we wanted to put on the medical officer; that one of these pouches with one litter strap would carry the equipment of both the dental technician and the dental officer,

with an insert which was made specially for the dental service; that one of these pouches would carry the full equipment of the veterinary officer, without any insert; that two of these pouches would carry the equipment of the veterinary noncommissioned officer, and two of these pouches would carry the equipment we wanted to put on the veterinary private. So that, in issue, the private would get one pair of suspenders, two pouches, two cantle ring carrying straps, two litter straps, the private insert and the contents to be carried; the medical noncommissioned officer would get the same equipment as the private with the exception of the insert, which would be the medical officer's and noncommissioned officer's insert.

He would, of course, in addition, get the equipment which he carries. The medical officer would get one pouch, one cantle ring carrying strap, one litter strap and the medical officer's and noncommissioned officer's insert, plus the equipment to be carried. The dental officer and the dental technician would each get one pouch, one cantle ring carrying strap, one litter strap and one dental insert, plus the equipment to be carried. The veterinary officer would get one pouch, one cantle ring carrying strap, one litter strap and the equipment which is to be carried. The veterinary noncommissioned officer would get one pair of suspenders, two pouches, two cantle ring carrying straps and his equipment. The veterinary private would get the same.

These units standardize the individual equipment of the three grades and three services of the medical department, eliminating the seven now in use and the eighth contemplated. They provide 100 per cent crisis expansion in each equipment and can be carried as hand bags, as haversacks, as saddle bags, on a belt alone, or, where two pouches constitute the equipment, on the suspender. Where two pouches are worn and it becomes necessary for a man to lie down and crawl along the ground, the swivel snap hooks connecting the two front rings can be removed and the second cantle ring carrying strap which is carried over the left-hand pouch can be connected across the man's waist so there is no equipment between the man's stomach and the ground. This permits the pouch to trail behind his arms as he crawls.

No lists of the contents of the various units are given here, since this study was concerned mainly with method and not particularly with material. The list of equipment proposed in the original study was of sufficient quantity and variety to assure us that the production of a standard pouch unit was practical. It is

now proposed to try out, with a few minor modifications, the equipment so proposed in the original study, all of the services agreeing that the space available in the carrying device is ample for their needs, though some slight changes in the dental and veterinary equipments have been made. None of these modifications, however, impose any hardship on the pouch. They therefore offer no obstacle to this method of standardization of the individual field carrying device for the entire Medical Department.

NOTE: The foregoing article was based on the original study submitted by the Medical Department Equipment Laboratory to the Surgeon General's Office under date of February 7, but since this study was accompanied by twenty-nine detail photographs, the cost of reproducing the photographs made its publication impracticable.

Since the study was submitted, several changes have been made in the equipment as originally proposed, but only one change in the pouch, and that consists of the elimination of the two loops of webbing on the back of the pouch, by means of which it was to be carried on the Sam Browne belt. In the place of these two loops of webbing there has been added a second swivel snap hook attached to the second "D" ring of the pouch so that each "D" ring will be equipped with a swivel snap hook. These snap hooks can be engaged in the eyelets provided in the standard slides with which the Sam Browne belt is equipped, so that the pouch can still be carried on the Sam Browne belt, but suspended properly from its "D" rings rather than from the fabric wall.

Slight modifications in the inserts have also been made to adapt them to the modifications made in the proposed equipment. The changes are of a very minor nature, however.

In order to test out this equipment thoroughly the Medical Department has placed an order for 500 pouches with the necessary accessory fittings to equip 9 dental officers, 9 dental technicians, 10 veterinary officers, 20 veterinary noncommissioned officers, 40 veterinary privates, 30 medical officers, 30 medical noncommissioned officers and 131 medical privates. In addition, suspenders, litter straps and canteen ring carrying straps, sufficient to produce 400 individual harnesses, have been purchased, to equip 200 of the wheeled litter carriers recently produced. These equipments are now being assembled and, when completed, will be distributed by the Surgeon General's Office to selected units for exhaustive comparative test and report.

This explanation is made in view of the fact that these equip-

ments, when they do come out, will vary slightly from the description of the development work given in the body of this article. The proposed tables of contents of these various equipments will, in all probability, be subjected to further change, so they are not published at this time.



## AN INSISTENT CAMPAIGN FOR VENEREAL DISEASE CONTROL IN THE ARMY OF FRANCE

By MAJOR A. N. TASKER  
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THROUGHOUT the current epoch of written history mankind has known the venereal diseases as in the forefront of his most implacable enemies. Constituting a problem so much the more difficult of solution because of their dependent connection—in the matter of dissemination—with the entirely normal function of biological reproduction, the race has struggled valiantly, but through many centuries without great avail, to free itself safely and surely from this ancient scourge without unduly interfering with the normal response to that compelling sex instinct upon which the persistence of human life on this planet depends. That abnormal social conditions tend to a subversion of the established order in so far as concerns monogamy, and that sexual promiscuity directs a current of oxygen into the flames of the venereal conflagration, are phases of the question that have been a theme for biologists and sociologists since ancient days. Among such conditions war holds a predominant position. No other disturbance of the politico-economical routine so modifies the normal current of human affairs of a nation as a whole, whether from the standpoint of the individual and the home or of great cities viewed community-wise, as does participation in an international clash of arms. From the biologist's viewpoint no element in this disturbance is more pronounced or of greater moment than that which by virtue of removing young men in great numbers from the accustomed atmosphere of their own firesides confronts them with a new phase of the problem of sex urge—all too often a phase concerning which in all its aspects they are woefully ignorant, and of which they unfortunately embrace the solution that lies easiest to their hand. For where troops are concentrated there prostitutes foregather, unless restrained by the iron rule of martial law. The concomitant lighting up of venereal epidemics and the causes thereof are so definitely understood as to need no further elucidation.

Venereal diseases have constituted—at least until within recent years—by far the most important morbidity factor affecting adversely the efficiency of armies in times of peace. It is true that in war this unenviable importance becomes relatively less; but the change is due rather to the incidence-increase in other infectious diseases in time of active campaign than to any very great actual decrease in the amount of venereal disease itself. The elimination of military inefficiency

resulting from this cause has long interested not only the military sanitarian but higher commanders and the far-seeing line officer in even equal or greater measure. In America there has been developed within the last twelve years in the nation's military and naval forces a scheme of venereal disease prevention which has given better results, other conditions being equal, than any methods previously devised. The application of these methods brought about a decrease for that portion of our army stationed within the continental limits of the United States between the years of 1911 and 1915 in the total annual admission rate per thousand from 163.85 in the former year to 83.60 in the latter year, while at the same time the non-effective rate was reduced from 8.82 to 3.99.<sup>1</sup>

The rates of venereal disease incidence in the American Army have always been higher than those of European armies, but it is not to be assumed that the only reason for this is any decided difference in the matter of moral tone. Many factors have contributed to this condition. A very considerable increase in venereal disease took place during the earlier years of the World War not only among the allied armies but among the civilian population of France as well, and this had begun to attract the very serious attention of French military authorities, sanitarians, and sociologists before the appearance of America on the western front. With our troops there went to France our system of venereal control reinforced by the application of certain additional measures which were found much more practicable under war conditions in Europe than they would have been under peace conditions in America. From the beginning the operation of our prophylactic program was watched with intense interest by the medical officers of the French Army. Many of them expressed very frankly their belief that no great amount of success would attend these efforts on our part, and their preference for their own system, which consisted essentially in periodical inspection of all prostitutes and the compulsory segregation and treatment of those found infected. The American Commander-in-Chief gave his unqualified approval to the preventive measures recommended by the Chief Surgeon, and the two systems, French and American, were employed side by side during the remainder of the war and for a period of several months after the armistice. Comparative figures do not tell the whole story of the relative success of the American program. The relatively munificent pay of the American soldier as compared with that of the French *poilu* tended to make the former notoriously a favorite in the eyes of French women who would engage in sexual barter.

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<sup>1</sup>"Military Hygiene," Havard, 3rd edition, p. 123.

Reliable statistics of the venereal disease rates in the other allied armies are not easily available in this country, but for the whole American Expeditionary Force the incidence rate per thousand of all venereal diseases for the year 1918, among officers and enlisted men (troops in Russia being excluded), was held down to the figure (remarkably low under existing conditions) of 22.32.<sup>2</sup> In general it may be said that under no other system could the venereal diseases have been held to so low a figure in the enormous temporary army of young Americans, adequately nourished, relatively well supplied with money, unaccustomed to and not subjected to the iron military discipline of continental Europe, as was done in the A. E. F.

An interesting light on the developmental progress in the matter of venereal prophylaxis in the French Army and Navy is furnished by the "Circular governing an Antivenereal Campaign in the Army," of which a free translation, but one believed to be adequate, follows:

The Minister of the Navy, the Minister of War *ad interim*, to the military governors-general of Paris, Lyon, Metz and Strasbourg; to the generals commanding the 1st to the 13th and the 15th to the 21st Army Corps; to the generals commanding the territorial troops of the Saare; the commanding general of the division of Tunisia; the commanding general of the French Army of the Rhine; the commanding general of the Army Corps stationed at Constantinople; and the Marshal General of France resident in Morocco.

Instructions have been sent you from time to time to give to the campaign in the Army against venereal diseases and alcoholism all due consideration. It now seems opportune, especially in view of the extent and gravity of the venereal peril, to condense into one set of instructions everything that has been previously sent out regarding this important question in order to facilitate the education of officers and soldiers in this matter.

### I. GENERAL PRINCIPLES

To secure results the antivenereal campaign must have the close and constant cooperation of the line and medical corps in all grades. The efforts of medical officers, of regimental commanders, of unit commanders, and of section leaders must be definitely coördinated. To take the initiative is a function of the medical officer. The importance of this campaign must be made evident to the eyes of the soldiers in each regiment by the required presence of unit commanders at all the lectures given to their men by medical officers. For the continuation of this instruction the section leader is responsible. His authority and his permanent contact with the private give him an exceptional opportunity for the exercise of moral influence.

### II. INSTRUCTION OF THE SECTION LEADERS

This should begin in the schools for officers and noncommissioned officers. In every school for officers and noncommissioned officers, and

<sup>2</sup>Memo, Surgeon General's Office, dated August 11, 1922.



in every center of instruction, special teaching is to be systematically carried on by medical officers. This instruction, essentially practical, will have as its purpose the development of an understanding on the part of officers and soldiers of the various aspects, individual and social, of the venereal peril, as well as of the different means by which it may be combatted, especially in military life. It should seek to make of all those to whom it is addressed active and convinced propagandists. Moreover, in the regiment, one at least of the lectures given on hygiene to officers and noncommissioned officers will be given up entirely to venereal diseases and their prevention.

### III. INSTRUCTION OF THE SOLDIER

This is to be begun at the time of enrollment, and by sustained efforts, which should be particularly intensive at the time of arrival of new contingents, is to be continued regularly throughout the whole period of the soldier's presence with the colors. Its aim is to arm the men against the venereal danger by dispelling their ignorance and their prejudices—two things which are equally baneful. Its methods consist in instruction by printed pamphlets, by individual advice, by conferences, lectures, and the moral influence of the soldiers' clubs (*foyer du soldat*).

#### A. INSTRUCTION BY PRINTED PAMPHLETS

This consists in the distribution to the men belonging to each annual contingent of four different pamphlets having to do with the subject of venereal disease prophylaxis. These are to be distributed respectively at (a) the time of the preliminary examination, (b) when called to the colors, (c) upon enrollment, and (d) upon discharge from active service. The first is to be given out upon occasion of the preliminary examination after having been explained orally by the prefect or his representative. The second is sent by mail with the order calling the man to the colors and is officially approved by the recruiting service. The third is distributed at the time of physical examination for enrollment by the medical officers, who give verbally such additional advice as seems best. The fourth is attached to the individual soldier's discharge papers (*livret*). It is explained and commented upon at a regimental lecture arranged especially for this purpose which takes place several days before discharge.

#### B. INDIVIDUAL ADVICE, CONFERENCES AND LECTURES

##### (a) *Individual Advice*

Medical officers will take every opportunity for giving individual advice to the men. Because this is done individually and because it has to do with his own bodily welfare, the man will remember more and will receive more benefit from what the medical officer tells him than he will from all other sources. Daily sick call, the bi-monthly sanitary inspections, the physical examination of those to whom furloughs have been granted (both when they depart and when they return) are particularly auspicious occasions for renewing this personal advice.

*(b) Conferences*

Officers and noncommissioned officers will hold every fifteen days or thereabouts "collective conversations" which may take place at the end of periods of military instruction whether in garrison or in the field. These will consist in the reading, with or without explanation, of the confidential pamphlet entitled "Frenchman, take care," which has been distributed at the time of enrollment, or of some other similar document having to do with venereal prophylaxis and prepared by a qualified medical man. The salient points of the lectures, which are to be referred to in the next paragraph, can be taken up for succinct discussion.

These two methods of individual advice and conferences have the advantage over the lecture that they can be employed at any moment whenever opportunity offers. Recourse must be had to them particularly in order to warn efficiently the recruits in that short period before the occasion when they first leave barracks and during which the antivenereal propaganda should be most insistent. The primary importance of this early instruction cannot be too much stressed. It should receive the best concerted efforts of the line and the medical corps.

*(c) Lectures*

There will be given to the men annually two lectures, a garrison lecture and a regimental lecture.

*Garrison Lecture.*—This will take place as soon as possible after the enrollment of the annual contingent. According to the capacity of the available meeting places, it will either bring together at one time all the troops of the garrison, or it will be given in succession to the various units of the garrison. The unit commanders and all officers and non-commissioned officers subordinate to them will be required to be present. These garrison lectures will be entrusted to the medical officers, but this will not preclude certain qualified civilians from being invited to give some of them. They will be, for the most part at any rate, delivered in each region by the senior medical officer in charge of the regional center for skin and venereal diseases. The lecturer should confine himself to language of the greatest simplicity and should remember that the educational value of his lectures depends in the very highest measure upon abundant illustration of the subject as it is developed. In order to explain the subject of the lecture and to make it as instructive as possible, there should be employed alternately both the projection lantern and an educational film. These, if intelligently chosen, will leave a very lasting impress upon the minds of those who see them, and this should be one of the principal objects aimed at by those who conduct these lectures. As partial payment of the expenses of these lectures the sum of 500 francs will, until further orders, be placed annually at the disposal of each military region or army. This money—which will be taken from the appropriation for sundry military purposes—will be placed to the credit of the senior finance officer (*directeur de l'intendance*) for the particular military region or army. The undersigned hopes to be able, in case circumstances permit, to review the statements of ex-

penditure of this allotment. It is always to be borne in mind that its insufficiency is more apparent than real, since it is compensated for in considerable measure by the presence of resources, local or otherwise, thanks to which these lectures may for the most part be given at very small expense. These resources include barracks, soldiers' clubs, the equipment and the necessary personnel for the use of moving pictures which are present in military schools and centers of physical instruction as well as in numerous clubs that are available by free loan or that may be hired at small expense for demonstrations of various kinds, lantern slides, models, etc. With all these adjuncts it will be possible to arrange a unique and very complete program for each region or army.

The following sources will be found helpful in supplying information as to the availability of these above-mentioned resources:

1. The central administration of the War Department (Office of the Minister; Bureau of Military Affairs) possesses 10 copies of the moving picture film, "It must be told," which are to be put in rotation at the disposition of the various regions.

2. There will be sent shortly to each of the following commands: The French Army of the Rhine, Saare, the forces occupying Constantinople, the French Army of the Levant, Morocco, Algeria, Tunisia—one of the collections of views which are supplied by the teaching service of the office of the Minister of Public Instruction and Fine Arts. The Director of the Museum of lantern slides, at 41 Rue Gay-Lussac, Paris, V<sup>e</sup>, distributes collections of slides which have to do with venereal diseases. These slides—which cannot be loaned outside of the continental limits of France (*en dehors de la métropole*)—will serve to illustrate the first part of a lecture prepared by the Museum of Pedagogy of which numerous copies were sent to the senior medical officers of the various army corps and armies in March, 1921. The boxes containing these collections of slides are sent, so far as may be possible, as a loan and postage-free to the military lecturers and are accompanied by a catalog and by directions governing their use. It is to be remembered that the museum does not lend lanterns.

3. Films prepared by Dr. Commandon (especially the organism of syphilis).

4. Films prepared by Pathé frères, 67, Rue de Faubourg-St. Martin, Paris.

5. Models of the Museum, St. Louis Hospital, 40, Rue Bichat, Paris.

Finally, there is always the possibility of such assistance being available as the participation of city governments, or the loan, either free or at a nominal charge, of the ordinary moving picture theaters for these lectures.

*Regimental Lecture.*—This will take place in each regiment a little before the date fixed for the discharge of the annual contingent. It will be conducted by medical officers of the regiment who for this purpose will have to take cognizance of the subject matter that has been treated of in the garrison lectures, and who themselves will be able to coördinate, since they are seeking their material from the same sources, the subject matter of their lectures with that treated of in the garrison lectures. It will be obligatory upon them to comment at this lecture upon the pamphlet entitled, "Young man, think of the future." They must also

discuss and explain the establishment and *modus operandi* of venereal prophylactic stations as well as the treatment of venereal diseases in the dispensaries.

#### IV. ENUMERATION OF THE CONCEPTS WHICH IT IS MOST IMPORTANT TO INSTILL INTO THE MINDS OF SOLDIERS

It is not practicable to define in detail the subjects for the lectures, conferences, and individual advice, since these should be varied in accordance with the circumstances in order that they may be adapted as well as possible to those to whom they are addressed and to individuals. But with this reservation and as a general principle, attention is invited to a certain number of points which should be taken under particular consideration in the instruction of soldiers in the matter of venereal diseases.

##### (a) The nature of venereal diseases.

Fundamental practical descriptions of the principal manifestations of these diseases and of their infectious nature. Stress their dangers, their consequences for the individual and their consequences to the family and society. Discuss the relation of syphilis and infant mortality. Discuss hereditary syphilis. Impress the imagination of the soldier by numerous examples.

##### (b) The conditions under which they develop.

*Direct infection:* Sexual and non-sexual.

*Indirect infection.*

*Professional infection:* Examples of physicians, nurses, wet nurses, and glass blowers.

*Venereal diseases and prostitution:* Dangers and pitfalls of the various forms of prostitution. Regulated prostitution—what it is necessary to know about it. The particular dangers of clandestine prostitution in all its forms. The deceptive character of appearances. Young prostitutes. Prostitutes newly embarked in that profession.

*Venereal diseases and alcoholism:* Alcoholism in addition to its own harmful effects is an indirect purveyor of venereal infection. The victims of the saloon and of the "boot-legger."

##### (c) Prevention of venereal diseases.

Exalt those principles of morality which elevate mankind and which develop self-respect. Early marriage. Insist upon the fact that abstinence and chastity, neither of which is ridiculous or harmful, are the only absolutely sure methods of escaping under all circumstances venereal disease. These elements of self-restraint having been emphatically stressed, next urge very strongly upon the men the necessity of taking precautions to diminish the danger of infection in case they do expose themselves to venereal contamination. Describe the presumptive signs of the venereal diseases in women and outline the precautions which the prostitute should be required to take before sexual intercourse. Insist strictly upon the necessity for cleanliness and individual prophylaxis. Explain the degree of safety that one may actually expect from this prophylaxis. Describe extra-genital syphilis. Put the men on their guard against the consequences which may result from certain infractions of the laws of hygiene, such as the loan of a

pipe, of a drinking cup, or of any table utensil to a comrade whoever he may be.

(d) Treatment of venereal diseases.

Insist that the presence of these diseases should not be kept secret because of shame. Combat the notion which leads too many young people to refrain from admitting that they are the victims of venereal disease, as a result of which they become purveyors to others and expose themselves to serious complications. Make it definitely understood that soldiers with venereal diseases have no punishment to fear on this particular account. Insist upon the absolute necessity of consulting the medical officer as soon as possible. Describe the manifestations of venereal disease which ought to lead a man to seek medical treatment. Stress most urgently the necessity of showing every lesion of the skin or mucous membrane, especially the slightest erosion or genital excoriation, no matter how small it may be, to a medical officer on the same day it is discovered. Urge upon the men that they must not apply to any lesion any antiseptic solution, powder or ointment before a definite diagnosis has been made by a medical officer. Contrast the results in a person infected with syphilis who has received *early*, proper and intensive treatment with the fate of the syphilitic whose treatment, no matter how careful and prolonged, has been *begun* too late. Describe the dangers of listening to advice given by incompetent persons (for example, by other soldiers, by quacks and charlatans) and especially of treatment by correspondence, etc. Outline what every person infected with venereal disease ought to know regarding his own treatment, his own personal hygiene, and his social duties. Discuss the relation between venereal diseases and dispensaries established for their treatment. The existence and *modus operandi* of these dispensaries ought especially to be made known to soldiers with venereal disease who are about to be discharged. Finally comment upon and explain the booklet on the treatment of syphilis.

Draw attention to the existence of scabies. Give instructions in the principal manifestations and methods of transmission. Insist particularly upon the necessity for consulting the medical officer immediately upon the appearance of any itching.

There will be found in the confidential pamphlet entitled, "Frenchman, take care; the Germans have been conquered, but greater enemies remain to be overthrown," as well as in the pamphlets distributed either by the boards of preliminary medical examination, with the orders calling the men to the colors, or at the time of discharge, the substance of the chapters which are of fundamental importance in antivenereal education. Information also useful in this matter may likewise be frequently found in documents of the same general nature as the foregoing prepared by physicians who are competent specialists in this subject.

#### V. SOLDIERS' CLUBS

As a result of the war these establishments which look to a higher morality and to temperance have been organized more and more fre-

quently. They seem, therefore, naturally to lend themselves to society as aids of increasing importance in the attainment of the aims under discussion. It is beneficial and valuable to encourage those among them whose organization is still only rudimentary, and to increase by every possible means the number of their patrons. Commanding officers will point out to recruits the soldiers' clubs that are carried on by civilian agencies outside the barracks as well as the material and moral advantages which are to be found in these meeting places.

#### VI. REPORTS OF ACTIVITIES

Four months at the latest after the enrollment of the annual contingent you will cause to be sent me, for your army corps, addressed to my office (Bureau of Military Affairs) at the same time that you make report of your financial allotment, a combined report concerning the measures which you have taken to execute the requirements of this present circular, and concerning the results which have been obtained. You will add to that report a list of the names of all officers who have been most highly successful in obtaining these results. On their side, the senior medical officers will prepare a report addressed to the 7th Division setting forth the names and stations of medical officers who shall have been detailed for the garrison lectures, the date of each lecture, and the methods of illustration there made use of. They will add thereto any expression of commendation which they think should be brought to the notice of the Minister. I rely upon your personal attention and upon that of all generals and corps commanders to assure in close coöperation with the medical corps the consummation of the measures which have been outlined above. It is necessary at every cost to prevent the corruption and weakening, as a result of their military service, of all those healthy and vigorous young men who have been received from the nation. As has already been said several times, the standards of individual morality are never elevated by the agency of ignorance and dissimulation. It is no more than our duty to society that we instruct our soldiers concerning certain dangers which threaten them and that we furnish them the means whereby, so far as may be possible, they can escape the consequences once they have been exposed to them. To this eminently patriotic activity all should devote themselves wholeheartedly.

(Signed) MINISTER OF THE NAVY, MINISTER OF  
WAR AD INTERIM,  
GUÏST'HAU.

#### APPENDIX

It seems advisable to conclude these regulations by a synopsis of the measures that they prescribe. The following table answers this purpose. So far as concerns the measures that have to do with the antivenereal education of the soldier they are presented in the order in which they are brought into use between the enrollment of one contingent and the discharge of the preceding contingent. There is reproduced also in simple form and in its essentials the system of propaganda which has been adopted.

## INSTRUCTION OF SECTION LEADERS

*In the schools and centers of instruction:*

Special instruction given by medical officers.

*In regiments:*

Lectures on hygiene given to officers and noncommissioned officers.

*Instruction of the Soldier*

Preliminary medical examination . . . . .	{ Pamphlet distributed by the board of preliminary medical examination.	{ Commented on orally by the prefect.
Order calling the men to the colors . . . . .	{ Pamphlet sent at the same time as the order.	{ Sent by the division of recruiting.
Enrollment . . . . .	{ Pamphlet distributed during medical examination at the time of enrollment.	{ By regimental medical officers.

Informal conferences on the part of unit commanders and section leaders (coördinated with individual advice given by medical officers) by which the recruits may be warned before the first occasion upon which they leave the barracks.

Before the occasion of first leaving barracks.	{ Garrison lectures.
	{ Bimonthly informal conferences.
	{ Pamphlet to men about to be discharged.
	{ Regimental lectures.

Discharge.

*Reports*

Four months at the latest after the enrollment of the annual contingent.	{ Report of use of allotment and combined report of instruction addressed to the Minister (Office; Bureau of Military Affairs) by the commandant.
	{ Report addressed to the Minister (7th Division; technical service, section of medicine) by the senior regional medical officers.

While, from the foregoing, it does not seem that the French have adopted all the elements which our own Army includes in its antivenereal measures (notably stoppage of pay of soldiers incapacitated for duty because of venereal disease), they are, on the other hand, now insisting strenuously upon the fact that sexual continence is in nowise inimical to physical strength, endurance, and the possession of all those qualities of mind and body that go to make up the best and most efficient officer or soldier. This circular does not lay great stress upon the prophylaxis of venereal disease by the application of chemical agents, but its minor references to such treatment would seem to indicate that it has been adopted as a part of the antivenereal campaign in the military and naval forces of France. Great interest will attach to the development and broadening of this hygienic effort and to the results secured thereby.



# REINFECTION IN SYPHILIS

## REPORT OF A CASE

BY CAPTAIN CHARLES E. BRENN

*Medical Corps, United States Army*

SINCE the advent of the arsphenamine group for the treatment of syphilis, the number of reported cases of reinfection has been constantly on the increase. It has long been held that, from the time a syphilitic infection becomes generalized until cure has been attained, syphilitic reinfection is impossible, regardless of whether the patient is in an active or a latent stage. This opinion has a wide range of supporters both in America and in other countries. Among those who have recently reported cases of syphilitic reinfection are Sweitzer (1), Paroungian (2), Spangenthal (3), Goldenberg and Chargin (4), Nelson (5), Schamberg (6), Pollitzer (7), Chargin (8) and Williams (9) in America; Western (10), Irvine (11) and White (12) in England; Oltramare (13), Lagage (14), Yerouchalmi (15), Sarrat (16), and Jeanselme and Burnier (17) in France; Arzt (18) and Zeissl (19) in Germany. Among cases presented by Drs. Stokes, O'Leary and Goeckermann (20) at the Minnesota Dermatological Society, August 6, 1921, one was a syphilitic reinfection.

When a patient known to have been a syphilitic develops a new lesion which appears to be a primary sore, the possibilities to be considered are (a) reinfection, (b) superinfection, (c) autoinfection, (d) infection with a new strain of spirochete, and (e) chancre redux.

There are still many venerologists who insist that reinfection is impossible; that "once a syphilitic, always a syphilitic." There are others who admit the possibility of reinfection but who demand, in addition to the usual requirements, two years of complete negativity followed by the development of the second lesion and subsequent secondary manifestations before they will accept the case as one of reinfection. There are still others who firmly believe in the possibility of reinfection and regard its occurrence as positive proof of cure. Jacobi (21) in a paper on "Reinfection and Curability in Syphilis," aptly remarks that "the presentation of such a case (reinfection) before a meeting of dermatologists is certain to precipitate a lively and somewhat acrimonious discussion which, after ranging far afield, usually ends in an *impasse*." In the same paper he takes his stand on the side of those who regard reinfection as definitely proved.

Williams (22) holds that the possibility that a patient with congenital syphilis may subsequently acquire the disease has never been



questioned. "Indeed, this occurrence is constantly invoked to explain the apparent cases of syphilis of the third generation. Why should we admit the possibility of reinfection in a congenital syphilitic patient and deny such a possibility in a victim of the acquired infection?" Parounagian (2) is of the opinion that cases of syphilitic reinfection should be reported for two reasons. In the first place, though the fact that reinfection takes place is now conceded, instances of true reinfection are not as common as many writers suppose. Secondly, as cases accumulate it becomes more and more evident that reinfection occurs under various and conflicting conditions. Schamberg (23) states that "as long as a patient is syphilitic, he is immune to a second infection. Obviously, then, a second infection is proof that he was free from syphilis." Pollitzer (7) remarks, "But where in the old days we had one case of reinfection, we now have a hundred. Every one of these cases, of course properly authenticated, is an absolute proof of the superiority of our present methods over the past." Bayly (24), under the heading "Reinfection," holds that if an individual is immune to syphilis, we may conclude that he is still infected with it; that cases of general paralysis have been inoculated without success. He mentions one definite instance in the cases of J. Hutchinson, senior, in which a patient had three attacks of syphilis.

Brown and Pearce (25) inoculated laboratory animals with a virus of the same virulence and after eighteen days treated them with arsphenamine and neoarsphenamine, 6 mg. and 9 mg. per kilo respectively; five days after treatment, these animals and untreated controls were reinoculated with the same original virus. Of the reinoculated treated animals, all but two developed typical chancres. They conclude that in animals the presence of *S. pallida* does not prevent the possibility of a second infection with the same organism and, as this state may be induced experimentally by specific treatment, insufficiently treated patients may be rendered as susceptible to a second infection as a normal person. These are superinfection lesions.

Hazen (26) states that "superinfection lesions do not develop in the typical manner; their period of incubation is shorter than usual and, when developed, their clinical characteristics resemble those of the stage of syphilis that the patient is in at the time, papular at the time of the secondary and ulcerative at the time of the tertiary. They are the expression of an altered tissue reaction." Parounagian (2) quotes McDonagh, whose views practically coincide with those of Hazen. Klauder (27), in writing of experimental work with superinfection lesions, states, "If in such lesions the treponemata were found in profusion and the Wassermann reaction was at first negative, later becoming

positive, it was evidence of the lesion being a primary sore, a reinfection; whereas, if the treponemata were present in scanty numbers and the Wassermann test was positive at the time of its appearance, it was evidence of a possible super-infection."

A very interesting case has recently been reported (28) in which a man, in order to prove to his physician that he did not have syphilis, inoculated himself and developed a lesion in which spirochetes were found; after treatment to a total of 8.50 grams arsenobenzol (arsphenamine) and a rest period of several months, in order to determine if he had been cured, he succeeded in reinoculating himself. After further treatment followed by another period of rest, he was able to reinoculate himself a second time. In the paper of Oltramare (13) nineteen cases were reported, including one case of double infection. He states that, pending a settlement of the theoretical problems of reinfection and superinfection, he considers as reinfections those cases following coitus between suspects where the chancre appears within the normal incubation period, contains spirochetes, and is accompanied by adenopathy. In such cases, he found the serum negative until the fifteenth day and positive before the appearance of secondary manifestations where no treatment had been given. He states that, as a rule, only patients who have had arsenobenzol (arsphenamine) treatment are susceptible to reinfection. The time interval in his series was: two cases within three months; seven within a year; the remainder after longer periods up to six years. He does not consider the interval between the two infections as extremely important, for he considers it probable that a patient may become reinfected as soon as his first infection is removed.

Yerouchalmi's (15) report concerns two syphilitic reinfections in the same patient four and nine years after the original infection. In the series of cases reported by White (12), case histories are given in ten cases which he found acceptable on all points, and in eighteen other cases which he considers reinfections but in which one or more links in the chain were missing; these occurred in 10,500 cases of syphilis seen at a British general hospital during a two-year period. In each case reported, both attacks of syphilis were observed by White. Benario's postulates as given by Parounagian are: (1) clinical demonstration of the primary sore; (2) microscopical demonstration of the spirochetes; (3) corresponding glandular swelling; (4) positive Wassermann reaction; (5) discovery of the source or medium of infection.

*Case Report.*—W. T. A., an unmarried colored soldier, 24 years old, on June 20, 1921, developed a preputial lesion two weeks after sexual exposure at which time no venereal prophylaxis was taken; was admitted to Walter Reed General Hospital on June 22; the patient also had a concurrent gonococcus infection, urethra, acute, which antedated the

appearance of the ulcer. The ulcer was slightly indurated and was accompanied by a general adenopathy. The record of the dark field examination could not be found on the clinical record for this admission, hence is unknown. Blood Wassermann reaction was double plus on June 30. On July 9, after one intravenous injection of novarsenobenzol (Billon), 0.45 gram, and one intramuscular injection of salicylate of mercury, 0.065 gram, the ulcer healed. A notation appearing on the clinical record under date of July 16 reads, "No clinical evidence of active gonorrhea or syphilis." The patient was held in hospital until after one complete course of antisyphilitic treatment to a total of 4.50 grams novarsenobenzol and 0.78 gram salicylate of mercury had been given. He was discharged to duty October 14, 1921. This soldier had had a prior admission to hospital for a non-venereal condition on March 26, 1921; his blood Wassermann reaction was plus minus on March 28 and negative on April 7; there was no adenopathy; all venereal infection was denied at that time.

On November 9, 1921, after no further treatment than protiodide of mercury by mouth, a blood Wassermann reaction at the Army Medical School was reported negative. About this same time (exact date uncertain) the patient had another sexual exposure, again without venereal prophylaxis. On December 5, nearly a month after exposure, a small lesion appeared at the most dependent portion of the prepuce. He was readmitted to hospital on December 8 at which time he presented an ulcer oval in shape, about 1 cm. in its long axis, moderately indurated, dirty in appearance, located about  $2\frac{1}{2}$  cm. from the healed scar of the previous infection, accompanied by a general adenopathy and a negative blood Wassermann reaction. The prepuce was very long and sufficiently swollen to render retraction impossible. A dark field examination was positive for treponemata. The ulcer was contaminated by unidentified organisms and a suppurative lymphadenitis, inguinal, right, was under way. A second course of antisyphilitic treatment was instituted on December 13, at which time the ulcer was covered with a dirty, purulent discharge. On December 14 the bubo was incised, curetted and drained; culture for Ducrey bacillus proved negative; dark field examination was not made on this material. On December 15 the prepuce was partially retracted and an additional small ulcer found at the meatus; no dark field was attempted on this ulcer as it had partly healed and antisyphilitic treatment had been instituted, rendering the finding of treponemata unlikely. Healing of the ulcers was complete by January 5, 1922, and of the bubo by January 16. On the 18th, the patient was returned to duty after receiving 0.6 gram arsphenamine (D.R.I.), 4.05 grams novarsenobenzol (Billon), and 0.39 gram salicylate of mercury; the remainder of the course, six weekly intramuscular injections of the mercury, to be given at patient's home station. Blood taken this date for Wassermann test was subsequently reported negative.

#### DISCUSSION

*Superinfection* is not thought to apply in the above case. The second chancre appeared within the normal incubation period after

sexual intercourse; was accompanied by a general adenopathy; blood Wassermann negative; dark field examination of ulcer positive, many treponemata being found.

*Autoinfection.*—As the incubation period in syphilis is usually said to be from three to six weeks, the interval of five months between the two attacks should be sufficient to rule out autoinfection in the above case.

*Strains.*—In view of the findings of Nichols (29) and of Reasoner (30), there is considerable possibility that the second attack was due to an infection with a new strain of spirochete. As no work of this nature was attempted, the strain question cannot be ruled out.

*Chancre Redux.*—Williams (22) mentions the lesion, described by Fournier under the title of "chancre redux," clinically indistinguishable from a chancre, occurring on the site of a previous chancre usually within a week or two of the healing of the first, a fresh ulceration in the induration remaining from the original sore. Williams states:

Under the same title, "chancre redux" or "recurring chancre," Hutchinson describes a lesion exactly resembling a chancre, which may occur after an interval of from a few months to several years and which almost invariably occurs in the site of the primary lesion. He states that it is not attended by glandular enlargement and is not contagious. The lesion described by Hutchinson as "chancre redux" had previously been described by Fournier as the pseudo-chancre indure, and the identity of the two is accepted by Hutchinson. Fournier states that the pseudo-chancre frequently occurs in the scar of primary lesions but he does not assert that this location is invariable. He gives the histories of three cases, in one of which the pseudo-chancre occurred on a different part of the penis, in another on the upper lip and in the third on the scrotum.

In the case reported above, chancre redux is excluded by the interval period of five months and by the distance of  $2\frac{1}{2}$  cm. between the second lesion and the scar of the first. The chancre redux of Hutchinson, or pseudo-chancre indure of Fournier, is excluded by the accompanying general adenopathy and the presence of treponemata by dark field, thus showing the infectiousness of the lesion in this case.

*Cure in Syphilis.*—The subject of syphilitic reinfection cannot be gone into without some reference to cure in syphilis, since reinfection necessarily implies that a given case has been cured. There is probably no ground more debated than this. It is generally conceded that the best chance of cure is in early recognized primary syphilis, and, while it would be interesting to await the development of secondary manifestations in possible cases of reinfection, as some writers insist should be done before making a diagnosis of reinfection, it hardly seems fair to the patient to needlessly prolong his chances of cure. Among the

requirements usually given to call a case cured are that the patient be negative both clinically and serologically, spinal fluid included, for a period of two or more years, negative "provocative" Wassermann reaction and negative Luetin test. To these Simon (31) has recently added negative Wassermann tests on urine, claiming this procedure to be as important as blood and spinal fluid reactions. In the case reported, it is true that there are no spinal fluid or "provocative" Wasserman records, neither was the case under observation for a period of two years. Some, however, do not consider these requirements always necessary. Schamberg (23) believes that there exist cases in which the disease is apparently eradicated by a few injections of arsphenamine. Oltramare (13) likewise inclines to this view. The present standard of cure in the United States Army (32) is as follows: one year of observation must elapse after all treatment has been stopped; during this year there must be no clinical evidences of syphilis, several negative Wassermann reactions and no positive ones, at the end of the year a complete physical and laboratory examination including that of the spinal fluid and a "provocative" Wassermann must be negative; if all these requirements have been fulfilled, the case may be closed as "cured" and the register sent in. Hazen (33), after summarizing the criteria of cure, remarks, "Personally, I sometimes feel as though the only real criterion of cure is the presence of a reinfection, and even here the causal organisms must be demonstrated in abundance or a local recurrence, chancre redux, would have to be thought of. Only the future can tell us just exactly what are the proper criteria."

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## LECTURE ON SOCIAL HYGIENE<sup>1</sup>

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*History.*—Since the dawn of history there is evidence to show that mankind has suffered from diseases which have been contracted through sexual intercourse with diseased persons. The oldest writings concerning these diseases come from China. In 2637 B.C., according to Dabny, the Chinese Emperor Hoang-Ti caused all medical knowledge to be reduced to writing, and among these records appears a description of syphilis in which its hereditary peculiarities are recognized and its treatment with mercury described. Dabny also shows that this disease was known to the Hindus in 1000 B.C., and Lancerieux has collected descriptions of syphilitic affections described by various authors from very remote periods. Marshall refers to the finding of bones in tombs which bear evidence of disease that could be produced only by syphilis, and Professor Parrot of Paris has described a female skeleton of the Stone Age found in Solutré, France, which shows unmistakable evidence of syphilis.

The Bible refers to venereal conditions which are recognizable. **Among the Jews, prostitution was prohibited** and the Jews resorted to the Midianites and the “daughters of Moab.” It was the Moabites who instituted the worship of Baal-Peor among the Jews, these Baal-Peor temples finally becoming the breeding places of loathsome diseases which existed at times in epidemic forms. When progress was about to be stayed by the ravages of disease, all men who visited the “daughters of Moab” were slain by Jehovah’s command, and the Bible tells us that the plague was finally stamped out after 24,000 lives had been sacrificed. As nearly as the date can be determined this was 1451 B.C. At a later date the worship of Baal-Peor was renewed, and the Israelites declared war against the Midianites because they seduced the sons of Israel. Moses then gave orders to kill all males and females who were guilty of illicit sexual relationship.

According to the Ebers Papyrus there existed in Egypt many hundred years before the birth of Christ a malady known as “uchedu,” which was an ulcerative condition affecting the eyes,

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<sup>1</sup>This lecture was written by Lt. Col. Hutton in the Office of the Surgeon General, U. S. Army, for the particular purpose of instructing American youths who attend R. O. T. C. and C. M. T. Camps in matters pertaining to venereal diseases, a subject which has long merited attention but which has hitherto never received it.

blood, bones, mouth, skin and anus. Herodotus speaks of a disease affecting the Scythians which we believe to be venereal in origin, and the Argueda of the Hindus mentions a communicable venereal infection which is referred to by the Chinese and Japanese as beginning in the genitals. Celsus, Hippocrates, Pliny and others refer to ulcerative disease of the genitals. Such classical writers as Horace, Catullus, Seneca, Cato, Cicero and Tacitus refer to sexual perversions and the diseases which result therefrom.

The terrible epidemic of venereal diseases of the fifteenth century was an event of the greatest magnitude. Charles VIII of France, in his wars to capture Naples from the Spaniards, permitted his armies in 1495 to indulge in broadcast licentiousness and rapine among the helpless Italians. It was during this siege that the great venereal epidemic broke out which scourged Western Europe and wrote some of the blackest pages in European history. Two years later, 1497, the French Parliament ordered all persons suffering from "large pox" to vacate the city of Paris within twenty-four hours. The next year the epidemic was scouring England and Scotland, and King James published a decree ordering all persons suffering from syphilis to leave Edinburgh. Provision was made for these unfortunates at an "isolated spot," and those remaining in the city were branded on the face.

Thus it will be seen that mankind, through worship at the shrine of Venus, has endured untold suffering for ages past; and today, while social customs and scientific medical treatment have done much to eradicate the epidemics that existed in former years, venereal disease still prevails and no known country or race is free from its onslaughts. Civilized countries, for centuries, in order to uphold national efficiency, have adopted varied and multiple measures to stay its progress, and of recent years all modern armies have sought, through education and other procedures, to reduce its evils. A soldier sick with venereal disease is not only a burden to his nation but a nuisance and impediment to the military force to which he belongs. From a military viewpoint he is a poor soldier and has been untrue to his country in not keeping himself physically fit to perform his duties. Socially, he is a peril to the civil population, and when his associates become aware of his infirmity he assumes the rôle of an unwelcome guest who is shunned by all self-respecting people and ostracized as effectively as would be a criminal guilty of an offense for which punishment by imprisonment is prescribed. This is as it should be.



*Prevailing Ignorance.*—There is much ignorance among the civil population concerning the prevalence and character of venereal diseases. Were it not for this ignorance there would be fewer exposures to venereal disease, fewer blind children, a smaller number of paralytics, fewer major surgical operations, less cripples and invalids and fewer untimely deaths. The public needs to be illumined and the youths of our nation should have pointed out to them the snares and the pitfalls which inevitably follow the departure from straight living. When men know about gonorrhea, syphilis and chancroids, they know also that they must be avoided. When they know that a large proportion of all prostitutes have syphilis, that nearly all have gonorrhea, and that many have both diseases, they are very likely to remain at a respectful distance. These diseases attack the rich and the poor alike, and no one enjoys immunity from them.

Not only is there ignorance concerning the prevalence of venereal diseases, but there is much ignorance concerning the character and seriousness of them. Occasionally one may overhear the remark that "gonorrhea is no worse than a bad cold." Such statements can come only from the densely ignorant or weak minded. The speakers do not know the tendencies of the wicked little germ which produces this disease, they do not know its migratory habits, they do not regard it as a destructive disorder, and they know nothing of the vast multitude which has succumbed to its attacks or of the misery and suffering it has provoked for ages past, not only among those guilty of immorality but among the innocent wives and children who have been guilty of no offense. They do not know the anatomy nor the function of the organs involved and regard the treatment of venereal disease as a simple procedure which can be carried out by any druggist or through the agency of any quack remedy which is accessible. It is because of such ignorance that venereal diseases still rage about us and because of such ignorance that the War Department has arranged that every student appearing in this and similar camps shall have placed before him the facts as they really exist, with the full expectation that each and everyone will stand ready to protect himself, his family, his comrade, the home of his fellow-citizen, his race and his nation. This vast subject, then, involves not only a military obligation. The obligation is also of a personal, civil, national and racial nature.

*Gonorrhea.*—It has been stated in the foregoing that gonorrhea

is a germ disease. A few days after exposure there develops a smarting when urine is passed, the male organ becomes reddened and swollen, a discharge of pus appears, and the testicles often become swollen and painful. These symptoms may be accompanied by a slight elevation of temperature, loss of appetite and indisposition to exertion. Such a patient is really ill and should be confined to bed until these symptoms subside. As a rule, if scientific treatment is applied at the onset, the disease may be cured in three or four weeks, but if the patient, in his endeavor to conceal his infirmity, undertakes a cure through quacks or advertised remedies, complications are likely to appear and the condition is apt to become chronic. While complications and chronicity are usually the result of unskilled treatment, there are numerous cases which, in spite of excellent treatment from the outset, nevertheless develop complications and pass into the chronic state.

Now let us see what is meant by acute and chronic conditions. The acute state is the beginning of the disease. This is the time when urination is painful and the time when the testicles are likely to become as large as an orange and most painful. It is also the stage in which there may be swellings of the glands in the groin, producing what is known as buboes. Unless these buboes are promptly treated, and sometimes in spite of all treatment, they pass on to pus formation, creating a condition of semi-invalidism and loathsomeness which persists for weeks or months. The constant discharge of large amounts of pus from these glands in the groin at times necessitates packing and the application of two or more huge absorbent dressings each day, a procedure which is loathsome, painful and expensive.

The swelling of the testicles is due to the passage of the disease-producing germs through the little tube which connects the testicle with the urine passage. There they set up an inflammatory process which causes the swelling. The extension of inflammation through the little tube sometimes destroys its channel and, if both sides are involved, the individual so afflicted is doomed to sterility. He cannot reproduce his kind.

As the disease-producing germ extends to the testicle, so, also, it may extend along the deeper part of the urine canal to the prostate gland and the bladder. The prostate gland enlarges and crowds upon the urine canal or urethra, causing difficulty in emptying the bladder. This is a condition which may persist for years, producing continued annoyance and requiring prolonged and pain-

ful treatment. Gonorrhea of the bladder is equally discomforting. On account of the inflammation the bladder is irritable and can hold only a small quantity of fluid before there is an intense desire to contract and expel it. This results in frequent urination. When the desire to empty the bladder appears, the sufferer usually has no option. The impulse is impelling and mandatory, and in spite of surroundings it must be gratified. Patients suffering from this condition must undergo continued treatment, including repeated washing out of the bladder, a procedure which is neither pleasant nor always effective in staying the progress of the invading enemy. Sometimes, in spite of all treatment, the enemy invades the tubes which conduct the urine from the kidney to the bladder, and then the unfortunate sufferer is beset with further complications which may require the passage of instruments through the bladder and to the kidney and through these instruments the introduction of strong medicine in the kidney. The points to be remembered are that gonorrhea may attack the testicle, prostate gland, bladder and kidney and leave them all in a damaged condition.

Thus far we have not spoken of stricture nor the systemic conditions. A stricture results from injury to the channel through which the urine passes from the bladder. This channel, known as the urethra, is the primary seat of the disorder. Ulcers form and, when these ulcers begin to heal, contraction occurs through the formation of scar tissue. As the scar tissue increases the flow of urine becomes more and more impeded until, finally, only a tiny jet may escape or, as occasionally happens, the channel may be entirely closed off. In this event a surgical operation is necessary, and in all cases of stricture, repeated and painful stretching by instrumentation offers the only road to cure.

Occasionally it happens that the germs producing this disease are picked up by the blood current and swept away to distant parts of the body. Lodging in the joints they produce what is known as gonorrheal rheumatism. This is gonorrhea of the joints, and those afflicted by it not only suffer intensely but are helpless and bed-ridden cripples for periods ranging from months to years.

Sometimes these germs which are in the blood stream settle in the heart and accumulate on the valves. There they set up an inflammatory process and we have gonorrhea of the heart. This inflammation of the valve interferes with its normal action, and in time we have valvular heart disease. The cases of sudden death

from overwhelming of the system by gonorrheal germs are usually attributable to this cause.

The eye is very susceptible to gonorrheal germs. If the fingers are polluted with gonorrheal discharges, rubbing of the eyes with the fingers may bring about gonorrhea of the eye. This is a very severe, destructive process which frequently causes total blindness.

While gonorrhea in the male may pursue a destructive and at times fatal course, the disease in the female is even more unfortunate. We have seen that the disease begins in the urethra of the male. In the female the birth canal is primarily invaded, and the subsequent extensions may involve all the reproductive organs and, in addition, the urethra, bladder, kidney, etc., exactly as in the male. When the germ passes beyond the uterus, it usually results in the formation of pus which destroys the affected organ and will destroy life unless an abdominal operation is performed. Children born to a woman suffering from gonorrhea are likely to have gonorrhea of the eyes, a considerable proportion of whom become permanently blinded. It is to these little unfortunate victims that our sympathy goes out—these who have done no wrong and yet who are doomed to eternal darkness through the ignorance or vices of one or both of their progenitors.

*Syphilis.*—Syphilis, for centuries, was known as the “Pest of Venus.” When Fracastorius in the sixteenth century wrote his famous poem in which he made a shepherd, whom he called Syphilis, a victim of the disease, the name of the shepherd was attached to the disease and has clung to it ever since. The name is now universal the world over.

Also, syphilis was formerly known as the “large pox.” Opposed to this was the smallpox, the great epidemic disease which through Jenner, who discovered and first practiced vaccination, has been held in check by all civilized nations. Syphilis is caused by a germ which is shaped something like a corkscrew and is, for that reason, called a spirillum. The first observable sign in syphilis is the primary sore, or chancre, which appears about three weeks after sexual contact with one who suffers from the disease. Afterward numerous glands in different parts of the body enlarge and in a few weeks the skin eruption occurs. The mouth and throat become sore, the hair sometimes falls out, deep ulcers appear, and finally, years after the original sore, every part of the body, including the bones and brain, may be attacked. In the later stages of syphilis the brain and spinal cord are particularly susceptible to the syphilis

germ and we get softening of the brain, insanity, paralysis and locomotor ataxia. Syphilis affords one of the striking examples of hereditary disease, the so-called congenital syphilis. Children born of syphilitic parents frequently present all the symptoms which beset their parents. The skin eruptions, ulcerations, bony defects and dental deficiencies, together with under-development, constitute a picture which is familiar to all physicians. Like the children who were blinded at birth through the existence of gonorrhea in their mothers these syphilitic children also must suffer for the sins of those who preceded them. Fortunately, 50 per cent die before they are one year old.

The wholesome manner in which all known syphilitics are avoided by intelligent people is a commentary on the loathsomeness of the wretched disease. Known to be contagious not only by sexual contact but also by kissing, use of the same pipe, drinking glass, knife and fork, etc., the syphilitic becomes an outcast, shunned by all and pitied by few. It is largely because these unfortunates may be encountered at public places that the common drinking cup has been relegated to the past and the common towel has been replaced by individual or paper towels. It is possible to convey the disease through these agencies, and many such cases have been recorded, but aside from the possibility of contracting the disease, the use of the common towel, drinking glass and cutlery is repulsive and should be most offensive, even to the ignorant.

In order to prevent the ravages of syphilis, early and intensive specific treatment is essential. It is difficult to cure, but by using all modern methods and freely employing the great arsenic compound, commonly known as 606, about 75 per cent of the victims can be cured. If promptly employed, treatment frequently stops its progress and prevents the terminal conditions and deep ulcerations, but it does not always cure. The treatment extends over several years, rarely less than three, and is governed by a blood test which is known as the Wassermann reaction. The 606 is introduced directly into one of the veins of the arm, an operation which should be performed by a skillful surgeon of extended experience. In addition to 606, other forms of medication are essential, and their administration must be scientific and long continued.

*Chancroids.*—Chancroids are not chancres, and they are not productive of syphilis. It is quite true that chancres and chancroids may coexist in the same patient, but they are different diseases and are caused by different germs. A chancroid is essentially a

local disorder and, if properly treated, gets no further than the glands in the groins, which usually break down, suppurate and discharge like the buboes described already as resulting from gonorrhea. If not treated, a chancroid becomes a sloughing and destructive process, the deep and extensive ulcerations eating away the genitals and adjoining structures. As compared to syphilis and chronic gonorrhea the treatment of chancroid in the early stage is not so complicated, yet, like other venereal diseases, it requires skillful and intelligent handling, and those who resort to quacks and charlatans will do so to their sorrow and deep regret.

*Modes of Transmission.*—Gonorrhea may be transmitted through the use of soiled towels, linen, etc., which have been polluted by gonorrheal discharges, but when so transmitted the disease is, for practical purposes, confined to the eyes. There have been many instances where women, children and others have lost their vision through gonorrhea of the eyes contracted in this innocent manner. Also, it is not infrequent to find persons who, while suffering from gonorrhea, have by rubbing their eyes after urination, etc., acquired gonorrhea of the eye. It is theoretically possible for one to acquire gonorrhea of the genitals in an innocent manner, but this is rarely if ever the case. The possibility of acquiring this disease through the agency of dirty toilet seats has probably been exaggerated. Nevertheless, no one wishes to use the same toilet that is used by gonorrheal patients nor is it advisable to do so. Such patients should be segregated and should have their own toilets, linen, bedding, etc.

Every now and then a gonorrheal patient will report with the claim that the disease appeared after lifting heavy weights. Such claims are absurd and may always be disregarded. Experience has shown that, except for gonorrhea of the eye, the disease is practically always contracted by direct sexual contact.

Concerning the transmission of syphilis, there is more to be said. We have already seen that syphilis is hereditary and that 50 per cent of syphilitic infants die before they are one year old. It is also transmitted by mechanical means, and the greatest care must be exercised by all syphilitics to avoid spreading this much dreaded disease among the innocent. A quite common mode of transmitting this disease is kissing. Under such circumstances the chancre appears on the lip, and the disease thereafter follows the same course as if the chancre has occurred on the genitals. Since syphilis usually attacks the mouth and throat, cutlery and crockery used

by syphilitics may become the agents of transmission. So, likewise, the towels, linen, clothing, etc., used by syphilitics may be sources of contagion, and it is for this reason that we find these patients avoided by all. The germ which causes this disease exists in the blood, and any instrumentation which draws the blood of a syphilitic is a possible source of infection. For instance, surgeons who operate on syphilitics may prick their fingers during the operation and thus contract syphilis. This method of transmission is not unusual, and any physician of your acquaintance will tell you of some brother surgeon who has thus acquired chancre of the finger.

Unlike gonorrhea, syphilis may begin in any part of the body, whereas gonorrhea is confined, in its inception, to the genitals and to the eyes.

Chancroids, being local, are generally regarded as being transmissible by sexual contact only.

*Veneral Incidence.*—By those who know nothing of the prevalence of venereal disease in the general population it is sometimes said that the rate in the military establishments is greater than among civilians. The annual admission rate for 1917-1918 for cases contracted after entry into the Army was 34.2 per 1,000. For those inducted into the service, and in whom venereal diseases existed in civil life, this rate was 93.32 per thousand. Of those who entered through the draft 196,000, or 5.6 per cent, had venereal disease. These figures are quoted even at the risk of being bore-some, in order that you may gather some idea of the prevalence of venereal disease among those engaged in civil pursuits. The condition is readily understood when one realizes the indifference of the average civil community as compared to the watchfulness and system of inspection practised by the military institution. And again, in the Army, if a soldier suffers from a venereal ailment, he is either kept in the hospital or confined to the post so long as he is capable of transmitting the disease. On the other hand, those so affected in civil life are permitted to roam at will and to distribute this disease in accord with their own fancies.

While there is good reason to believe that the venereal incidence in the Army is considerably less than among men of the same class and age in civil life, these diseases, nevertheless, furnish one-fourth of the non-effective rate for the entire service. Translated into number of days lost through this source, the non-effective rate thus produced might be the deciding factor in a battle upon which the fate of this nation hinged.

*Prophylaxis.*—Much national and at times international interest has been manifested in venereal prophylactic measures which include a prophylactic treatment for those soldiers who, in violation of instructions, expose themselves to venereal infection. The prophylactic service has been adopted in our army as one of the measures to reduce the incidence of venereal disease and is merely a part of the machine which has been created to conduct the campaign against these maladies. It is not a sure agency of prevention and all soldiers are so informed, but its employment is followed by a reduced incidence.

Prophylaxis, then, is a measure tolerated by the military establishment merely because it is a recognized fact that some men, in spite of all warning, will at times run the risk involved. To this class, which cannot be reached by teaching or by appealing to the higher moral senses, prophylaxis is offered as a last resort and for what it is worth. It is better than nothing and, since soap and water are vigorously applied, it has the argument of cleanliness on its side, but you must not make the mistake of regarding it as a certain preventive. It is not. Furthermore, high-minded men who respect themselves, their mothers, sisters and families, will have no occasion to resort to a measure which was instituted for those who are lacking in self-control and who feel no degradation in consorting with the degenerate disease mongers who indiscriminately accost men on the streets or who ply their trade in abominable brothels whose location is kept secret from all save the debased classes who frequent them.

Venereal disorders belong to the class of preventable diseases and, because they are entirely preventable, the Government punishes soldiers who contract them. While under treatment in hospital, or while absent from duty on this account, pay is stopped. If treatment in the hospital is no longer required and the soldier is physically competent to perform military duty, though still capable of conveying the disease, he is confined to the limits of the post until this danger no longer exists. Conduct unbecoming an officer or soldier, and to the scandal and disgrace of the military service, is punishable by court-martial. Drunkenness and relations with immoral women are included under such conduct.

Among many young men alcohol has, in the past, been responsible for the loss of self-control, but this source of lowered morality is likely henceforth to be a smaller factor in its bearing on national efficiency, both through alcoholism and the contraction of venereal



maladies which are incident to the loss of self-control while under its influence. While alcohol is less accessible and the amount consumed therefore notably less than formerly, it is to be remembered that complications arising from drinking alcoholic beverages are now proportionately more frequent than when it was publicly sold. A very large percentage of all bootleg liquor contains wood alcohol, a poisonous chemical which is likely to produce sudden death or else leave the consumer temporarily or permanently blind. The danger, then, of drinking is, under present circumstances, even greater than it used to be.

*Prevention.*—There is one sure way to avoid venereal diseases and their disastrous consequences, and only one. We have stated that the vast majority of all prostitutes are infected and a good many of them have gonorrhea, syphilis and chancroids which they frequently impart to their consorts. Some of the European countries and Japan have instituted a system of segregation and inspection of prostitutes with the hope of lessening the incidence of social disease, but every attempt in this direction has resulted in failure. Practically no reduction in incidence has followed. The prostitute is required to carry a card, with her name and photograph, on which the examiner states that she has been examined by him and found free from social diseases. The examination, as usually conducted, is a farce because opinion is based merely upon ocular evidence. These women usually appear in large groups each week and the examination is, therefore, hastily and imperfectly conducted. But assuming that it could be perfectly performed, it would leave much to be desired. Let us assume that a prostitute has been properly examined today. Tonight she is infected, and from then on until the next weekly examination she is spreading her loathsome disease to all of her customers. There is no way to avoid this, and in reality this is what actually happens. Segregation and examination of prostitutes has done little or nothing toward stamping out vice conditions, and the practice should be discontinued for the reason that among the ignorant a false sense of security is engendered by the presentation of a card which states that the carrier is free from disease, which statement is frequently false and, to those who know conditions, carries no conviction, even if true at the date of examination. Persons presenting such cards are to be universally avoided, but since prostitution in this country is not recognized, the prostitutes cannot present cards. Nevertheless, all prostitutes are to be avoided, and all women who solicit

are prostitutes. Remember that such a creature is after money. She cares nothing for you and is disregarding of whether or not you contract her diseases. A prostitute is usually a degenerate, and as such you must recognize her. Prostitution is her business, degeneracy frequently is her stock in trade, promiscuity is her practice, and the dissemination of venereal diseases is her custom. If one accosts you on the street, pass her by unnoticed. If one lays hands upon your arm or clothing, remove them with a firm grasp and continue on your way. The consolation that comes from a realization of what has been avoided is immeasurably great, and when you return to your mother, your sister and your sweetheart, you can look them straight in the eye with the full knowledge that you have been as true to them as they have been to you.

It was stated above that there was one way to avoid venereal disease. It does not require the wisdom of a Solomon to deduce that these diseases are to be avoided by abstinence only. This is the sure way; this is the natural way and the right way. All other methods, along whatever lines they may be directed, will be fraught with peril.

Some ill-advised and ignorant men expound the idea, hoping thereby to justify their own conduct, that sexual indulgence is essential to good health. Such a statement is fallacious and has no foundation. Continence is perfectly compatible with health. We have only to refer to Arctic explorers, sailors on long cruises, prisoners, etc., who in the prime of life are separated from females year after year and who remain in robust health. Continence is both healthful and manly. Abuse of the sex impulse is socially and morally degrading and, if carried to excess, wrecks the physique.

Men who keep their minds and hands busy are much less apt to resort to sexual promiscuity than those who engage in no mental pursuit and who permit their thoughts to dwell on matters sexual. Intellectual energy, work and athletics keep the mind and body occupied. They keep the higher senses keen and drive away the bestial impulses which, at times, try to break through the armour of self-respect. We need also good hygiene, we must have recreation and, in order to live up to the higher ideals of life, we must have cleanliness. We need no drugs to subdue our passions. Every physician is consulted by young men who, because they have so-called "wet dreams," believe that their constitution will ultimately become impaired and their general health undermined. Nothing could be further from the truth. The wet dream is productive of no

harm to young men, and it is nature's own way of eliminating excessive secretions. If it occurs to you, don't worry about it. And while we are speaking of fallacious beliefs that gain currency among young men, it might be well to dispel the idea that continence causes pimples on the face or that self-abuse causes insanity. The latter does not cause insanity, but it tends to weaken the individual and, at the same time, lowers self-control and decreases self-respect. The practice is therefore vicious and degrading but it does not produce insanity.

*Athletics.*—A strong, robust young athlete is, generally speaking, not only healthy in body but is healthy in mind. His athletic development has been largely dependent upon normal exercise, normal sleeping, normal eating and normal thinking. His mind has not been permitted to dwell upon the sordid sexual associations which frequently precede the physical as well as mental downfall of what might otherwise be a promising career. It is, then, a necessity that you undergo physical and mental exercise. The human organism cannot be normal nor perform its functions satisfactorily without health-giving exercise of the various muscles, nor can the brain function perfectly if it, also, is not exercised. And the exercise of both of them will drive away the sordid thoughts of illicit sex relationship and tend to protect you from the evils of sexual disorders. When your mental work is over for the day, try to take part in a game of tennis, baseball, football, basket ball or take a bicycle ride or a long jaunt on foot. Gymnasiums are good and the benefit which you derive from them is tremendous, but do not forget that exercise in the open air is better. Swimming, fishing, hunting, marching, camping, etc., develop heart, lungs and other vital organs and are great upbuilders of the human race. When a normal man lives as nature intended, it is no hardship to remain continent.

In training for athletic contests all athletes are invariably required to refrain from alcoholic drinks and sexual indulgence. Those who belong to the military arm of the Government are always under training rules and, as members of a fighting branch, they must be at all times physically fit to respond to the needs of the nation.

*Amusement.*—Amusement is an essential adjunct to the lives of all young men who would lead normal lives. Of the diversified types available, some will select one and others another. Some are content to read, others like to dance, some prefer the theaters, a

few select the pool rooms, and some are content to devote themselves to athletics and outdoor amusements. Attendance at baseball games, tennis matches and other athletic contests constitutes a delightful form of recreation for the average man, but our situation is frequently such that reliance has to be placed principally on indoor amusements.

The reading of good books appeals to a great many because they not only provide amusement but, at the same time, develop the mind; and, if the books are properly chosen, ideals are raised and the character strengthened. Books based upon sexual matters may have the opposite effect, and for this reason, when you read, be careful to select the best books written by authors of accepted standard.

Also, when you attend a theater, choose a play which is not founded upon impulses of sex. While such plays invariably try to point out the folly of loose living, they also direct the mind along sexual channels and the average young man will be better amused and, at the same time, less likely to have his passions aroused if he chooses plays of another type. This applies to moving pictures as well as the legitimate theatrical performance.

Pool and billiards afford a wholesome diversion provided the tables are located in a private home or acceptable club, but, unfortunately, these games are generally played in public halls which are frequented by those whom you would not choose as companions or whose acquaintance you would not care to cultivate. There is objection to the environment of the public pool and billiard rooms, but the games themselves are to be commended as affording both recreation and exercise.

Dancing is a form of recreation which has been practiced by all peoples for ages past, and when the surroundings are good it is to be commended and encouraged. If practiced at the private home or at functions given by high schools, colleges, etc., it is a health-giving and wholesome amusement. The average dance hall seen in all cities is a snare to be avoided, the dancers frequently being drawn from all walks of life among whom, at times, may be found women of lewd character who choose the dance hall as a convenient point from which to operate. It is no deprivation to refrain from attending dances at public dance halls. Dance all you like, but do so with friends of your own mental and moral standard, leaving the public dance halls to others of lower standards.

Amusement, properly selected and practiced during your rest

hours, will keep your mind from dwelling on sexual subjects and make it easier to keep your passions under control.

*Cleanliness.*—After exercising, put on your sweater until you can take a bath, rub down until your skin glows, read something pleasant and amusing for half an hour and then resume your routine. But always bathe after exercising, and when you rise in the morning, if convenient, bathe again. Whoever said that cleanliness was next to godliness gave us, at least, one true axiom. Keep your skin, as well as your thoughts, clean. No other one factor is more conducive to higher living and classic standards than cleanliness.

*Moral Side.*—Continence should be as common in the male as in the female, yet there are many more infractions by the man than by the woman. Which one of you would knowingly marry a girl whom you knew to be promiscuous in her relationship with men? We demand of them straight living, and they have the right to demand the same standard of us. There is no foundation for the existence of a double standard for the two sexes, and it is our task to teach clean living in men as well as in women. Our obligations to our fellow-man and to our nation should require us to curb our passions and exercise self-restraint in order that the family institution may be paramount to the sordid impulses of sex.

Our great president, Theodore Roosevelt, has said:

The men owe it to themselves to lead clean lives; they owe it to their sweethearts and future wives and to the children who are to come after them; they owe it to the respect they feel for their mothers and sisters; and as sailors they owe it to the Navy to which they belong and the nation which they represent.

Let them lead clean, self-respecting lives, in the first place because it's the straight, decent, self-respecting thing to do; next because it's the only way in which to give the square deal to the women of the right type, who, heaven knows, need the square deal; and finally because they owe it to the country not to ruin their efficiency as sailors and citizens.



## THREE TYPES OF ARMY HOSPITAL<sup>1</sup>

### THE SURGICAL HOSPITAL

THE surgical hospital is a mobile hospital designed to provide surgical treatment for the more severe battle casualties formerly classified as the non-transportable wounded. It is the outcome of the service in the World War and the institution that functioned in that capacity in France was known as the mobile hospital. It has a normal capacity of 250 patients and operating facilities for the continuous employment of 9 surgical teams with all the necessary X-ray, lighting, sterilizing and other apparatus. Being a mobile institution, it is usually housed under canvas and is transported by trucks. The nature of the terrain over which this hospital operates is usually such as to remove it from railroad transportation facilities. These hospitals operate under the control of the army surgeon, but their actual assignment and location in support of the division in action is usually placed in the hands of the corps surgeon under whose immediate supervision they function in combat. It is expected that these units will be provided on the basis of twelve for each tactical army, one being intended for assignment to each division in the line.

The idea underlying the use of these hospitals in combat is to furnish surgical treatment as early as practicable to the seriously wounded as far to the front as possible, thus avoiding the danger to the seriously wounded man that might result in his transportation to the hospitals in the rear and the delay incident to evacuation.

In applying the principle of early surgical treatment of the seriously wounded during the World War it became necessary to augment one of the field hospitals of the divisional sanitary train and to designate this institution in the evacuation order as the hospital to which the more seriously wounded would be transferred. This resulted in the immobilization of one of the field hospitals of the division and violated the basic principle that all constituents of a tactical division must maintain their mobility at all times and at all cost.

Previous to the engagement the surgical hospital is established by the corps surgeon as near as practicable to the hospital station of the division (established by the medical regiment). As the wounded from the division are brought to the triage established at the hospital station, the more seriously injured and those requir-

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<sup>1</sup> Prepared in the Office of the Surgeon General of the Army.

ing immediate surgical attention are sent to the surgical hospital either by litter or wheel transportation.

Owing to the serious nature of the cases operated in the surgical hospital, there is a natural tendency for the institution to become immobilized. Steady evacuation, however, is carried on as soon as the condition of the patients permits. If the division continues to advance and the need of a surgical hospital develops farther toward the front, another surgical hospital is turned over to the corps surgeon by the army to be set up in connection with the division in its new location, thus "leap-frogging" the former surgical hospital, which becomes more or less fixed or immobilized on account of the serious nature of its post-operative cases. As soon as this hospital is completely evacuated, it is re-equipped and re-organized for further use under the direction of the corps surgeon or reverts to its position in reserve under the control of the army surgeon.

TABLE 284 W.—MEDICAL DEPARTMENT, SURGICAL HOSPITAL (250 BEDS)  
(War Strength August 31, 1921)

Unit, one surgical hospital	Commissioned officers	Remarks
Lieutenant Colonels.....	1	(a) May be Med. Admin. Corps.
Majors.....	2	(c) Chaplain.
Captains.....	3a 16	(d) Dental Service.
Lieutenants.....	1c 1d	(b) Includes 26 Pvts. 1st Cl. 53 Pvts.
Total Commissioned.....	19	
Nurses.....	20	
Master Sergeants.....	1	
Technical Sergeants.....	1	
Staff Sergeants.....	3	
Sergeants.....	6	
Privates 1st Cl. & Pvts., inclusive	79b	
<i>Specialists' Ratings</i>		
Chauffeurs.....	5th (2)	
Chauffeurs.....	6th (2)	
Clerks.....	4th (2)	
Cooks, Hospital.....	2nd (1)	
Cooks, First.....	4th (2)	
Cooks, Assistant.....	5th (3)	
Electricians.....	4th (1)	
Mechanics.....	4th (1)	
Mechanics.....	6th (2)	
Messengers, Mtcy.....	6th (2)	
Med. Dept. Tech.....	2nd (1)	
Med. Dept. Tech.....	3rd (1)	
Med. Dept. Tech.....	4th (20)	
Med. Dept. Tech.....	5th (2)	
Med. Dept. Tech.....	6th (12)	
Misc. (Not Rated).....	(25)	
Total Enlisted.....	90	
Aggregate.....	129	
Trailers, Tank, 180 Gal.....	1	
Trailers, Kitchen.....	1	
Trucks, $\frac{3}{4}$ ton, Cargo.....	1	
Trucks, $1\frac{1}{2}$ -2 ton, Cargo.....	2	
Cars, Motor, 5 passenger.....	1	
Motorcycles with Side Cars.....	2	
Bicycles.....	2	
		<i>Summary of Specialists' Ratings</i>
		2nd Class..... 2
		3rd Class..... 1
		4th Class..... 26
		5th Class..... 7
		6th Class..... 18
		Total..... 54
		<i>Detailed Summary of Medical Dept. Technicians</i>
		Specialists, 2nd Class:
		1 X-Ray Technician.
		Specialists, 3rd Class:
		1 Sanitary Technician.
		Specialists, 4th Class:
		1 Sanitary Technician.
		7 Surgical Technicians.
		10 Clinical Technicians.
		1 Pharmacal Technician.
		1 Dental Technician.
		Specialists, 5th Class:
		1 X-Ray Technician.
		1 Property Technician.
		Specialists, 6th Class:
		1 Sanitary Technician.
		1 Surgical Technician.
		10 Clinical Technicians.

## SURGICAL HOSPITAL (250 BEDS)

## PERSONNEL FUNCTION AND ENLISTED SPECIALISTS

*Commanding Officer, Adjutant and Detachment Commander*

1 Lieut. Colonel M. C. (Commanding Officer)	1 Technical Sergeant (1st Serg.)
1 Captain M. A. C. (Detach. Comm., Adjutant, Fire Marshal and Evacuation Officer)	2 Sergeants (1 for guard, members of which are furnished from line)
1 Master Sergeant	1 Clerk 4th Class
	2 Privates 1st Cl., or Pvts. not rated

*Personnel and General Records*

1 Staff Sergeant	1 Clerk 4th Cl.	1 Private 1st Cl. not rated
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*Registrar and Detachment of Patients*

1 1st Lieut. M. A. C. (Registrar and C. O. Detach. of Patients)	1 Sergeant
1 Staff Sergeant	1 <i>Sanitary Tech.</i> 3rd Cl. (S. and W. Clerk)
	1 Private 1st Cl. or Pvt. not rated

*Surgical Service, Triage and Patients' Equipment*

2 Majors M. C. (1 Chief of Serv. Operating Teams personnel)	1 <i>Surgical Tech.</i> 6th Class (6 Operating Teams)
10 Captains M. C. (Operating Teams Per.)	6 <i>Surgical Tech.</i> 4th Class (8 Hospital Wards)
1 Staff Sergeant (Supervisor)	8 <i>Clinical Tech.</i> 4th Class
1 <i>Sanitary Tech.</i> 4th Cl. (Record Clerk)	8 <i>Clinical Tech.</i> 6th Class
1 <i>Sanitary Tech.</i> 6th Cl. (Record Clerk)	8 Privates 1st Cl. and Pvts. not rated (2 Evacuation Wards)
6 Privates 1st Cl. and Pvt. not rated (Sterilizing Room)	2 <i>Clinical Tech.</i> 4th Class
1 <i>Surgical Tech.</i> 4th Class	2 <i>Clinical Tech.</i> 6th Class
	2 Privates 1st Cl. or Pvts. not rated

*Pharmacy*

1 <i>Dispensary Technician</i> 4th Class
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*X-Ray Service*

1 Captain or 1st Lieut. M. C.	1 <i>X-Ray Technician</i> 5th Cl.
1 <i>X-Ray Technician</i> 2nd Cl.	

*Dental Service*

1 Captain or 1st Lieutenant D. C.	1 <i>Dental Technician</i> 4th Cl.
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*Supply Officer*

1 Captain or 1st Lieut. M. A. C. (Supply and Mess Officer)	1 <i>Mechanic</i> 4th Class
1 Sergeant	2 <i>Mechanic</i> 6th Class
1 <i>Property Tech.</i> 5th Class	1 <i>Electrician</i> 4th Class
	4 Privates 1st Cl. or Pvts. not rated



*Messes*

1 Sergeant	2 Cooks, First 4th Class
1 Cook, Hospital 2nd Class	3 Cooks, Assistant 5th Cl.

*Transportation*

1 Sergeant	2 Chauffeurs 6th Cl.
2 Chauffeurs 5th Cl.	2 Motorcyclists 6th Cl.

*Religious Ministrations and Recreation*

1 Chaplain	1 Private
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*Detachment of Nurses*

1 Chief Nurse (1st Lieutenant)	18 Nurses (2nd Lieutenants)
1 Dietitian (2nd Lieutenant)	

## THE EVACUATION HOSPITAL

The evacuation hospital is one of the most important hospitals of the Army in time of combat. Through this institution pass practically all the sick, gassed and wounded from the front after receiving such care and treatment as may be given by the divisional units and in some instances by the mobile hospital. Upon these hospitals falls the brunt of the preliminary care of battle casualties. They are the keystone of hospitalization in the combat zone, acting as the neck of the funnel through which all casualties coming in from the front pass in their evacuation to the rear.

Evacuation hospitals have a normal capacity for 750 patients, and are located at the rail head or along the railroad. They are housed in permanent structures whenever practicable. It is almost an invariable rule that the evacuation hospital is set up so as to be provided with rail transportation for purposes of supply and evacuation. As the name implies, their chief function is to collect all the wounded from the battle zone and prepare the cases for transportation to the general hospitals in the rear for definitive treatment and disposition. They therefore receive all classes of patients—the sick, the wounded and the gassed. On account of the large amount of surgery performed in these institutions, the military authorities usually attempt to divert the normal sick to other institutions so as to relieve the congestion in evacuation hospitals and allow them to perform their functions in the care of the battle casualties alone.

Evacuation hospitals are army units and function under the direction of the Surgeon of the Army. They are furnished in the proportion of fifteen to each tactical army. They are transported almost exclusively by rail.

Patients are received by evacuation hospitals usually by ambulance transportation, having received only first-aid treatment such as can be given by the divisional medical personnel. Arriving at the evacuation hospital the patients pass through a triage where they are classified according to their needs from a professional standpoint and their disposition from a military standpoint. In order to avoid burdening the transportation facilities, the slightly sick and wounded are either held in a section of the hospital or treated in a nearby hospital established for this purpose in order to save for the divisions at the front the maximum number of effective men. All patients requiring surgical treatment are passed through the operating rooms where the necessary surgery is performed, the patients placed in the post operative wards and prepared for transportation by hospital train as soon as their physical condition permits. A steady stream of sick and wounded, therefore, passes into the hospital during combat. The evacuation of these hospitals is accomplished by means of hospital trains directed to the hospital siding by an evacuating officer on the staff of the army commander. When the tide of wounded is high, the treatment is confined to emergency surgery and evacuation by hospital trains to the rear is speeded up. Trains with "pre-operative cases" are practically all dispatched to the nearer general hospitals for definitive treatment while "post-operative" trains are dispatched to the more distant general hospitals. Whenever the condition of the roads to the front and evacuating facilities permit, evacuation hospitals are paired or grouped. In such instances it becomes possible to specialize these hospitals in the care of the varieties of battle casualties. Military conditions may, on the other hand, necessitate the designation of certain evacuation hospitals for the exclusive treatment of the various classes of casualties such as the seriously wounded, normal sick, infectious diseases, gas cases, etc. Ordinarily, however, every evacuation hospital receives all classes of non-effectives, classifies them and returns them to the front or evacuates them to the general hospitals in the rear.

TABLE 283 W.—MEDICAL DEPARTMENT, EVACUATION HOSPITAL  
(750 BEDS)

(War Strength August 31, 1921)

Unit, one evacuation hospital	Commissioned officers	Remarks
Colonels.....	1	
Lieutenant Colonels.....	2	(a) May be Med. Admin. Corps.
Majors.....	7	(d) Dental Service.
Captains.....	2d 28 1q	(c) Chaplain.
Lieutenants.....	1c 4a	(g) Quartermaster Corps.
Total Commissioned.....	38	(b) Includes 82 Privates 1st Cl. 164 Privates.
Nurses.....	50	
Master Sergeants.....	1	
Technical Sergeants.....	2	
Staff Sergeants.....	9	
Sergeants.....	21	
Corporals.....	2	
Privates 1st Cl. & Privates, including.....	246b	
<i>Specialists' Ratings</i>		<i>Summary of Specialists' Ratings</i>
Bakers.....4th.....	(2)	2nd Class.....3
Buglers.....	(2)	3rd Class.....5
Carpenters.....5th.....	(1)	4th Class.....83
Chauffeurs.....5th.....	(3)	5th Class.....17
Chauffeurs.....6th.....	(3)	6th Class.....44
Clerks.....3rd.....	(2)	Total.....152
Clerks.....4th.....	(2)	
Cooks, Hospital.....2nd.....	(2)	<i>Detailed Summary of Med. Dept. Technicians</i>
Cooks, First.....4th.....	(5)	Specialists, 2nd Class:
Cooks, Assistant.....5th.....	(7)	1 X-Ray Technician.
Electricians.....4th.....	(1)	Specialists, 3rd Class:
Mechanics.....3rd.....	(1)	1 Sanitary Technician.
Mechanics.....4th.....	(1)	1 Pharmacal Technician.
Mechanics.....6th.....	(1)	Specialists, 4th Class:
Messengers, Motorcycle.....6th.....	(2)	1 Sanitary Technician.
Switchboard Operator.....6th.....	(2)	1 Pharmacal Technician.
Med. Dept. Tech.....2d.....	(1)	1 X-Ray Technician.
Med. Dept. Tech.....3d.....	(2)	1 Laboratory Technician.
Med. Dept. Tech.....4th.....	(72)	9 Surgical Technicians.
Med. Dept. Tech.....5th.....	(6)	56 Clinical Technicians.
Med. Dept. Tech.....6th.....	(36)	1 Property Technician.
Miscellaneous (Not Rated).....	(92)	2 Dental Technicians.
Total Enlisted.....	281	Specialists, 5th Class:
Aggregate.....	369	1 Sanitary Technician.
Trailers, Tank, 180 Gal.....	2	4 Clinical Technicians.
Trailers, Kitchen.....	1	1 Property Technician.
Trucks, ¾ ton, Cargo.....	1	Specialists, 6th Class:
Trucks, 3-5 ton, Cargo.....	4	1 Sanitary Technician.
Cars, Motor, 5 passenger.....	1	1 Laboratory Technician.
Motorcycles with side cars.....	2	6 Surgical Technicians.
Bicycles.....	1	28 Clinical Technicians.

## EVACUATION HOSPITAL (750 BEDS)

## PERSONNEL FUNCTION AND ENLISTED SPECIALISTS

*Commanding Officer and Adjutant*

1 Colonel, M. C. (Commanding Officer)	1 Master Sergeant (Sergeant Major)
1 Major M. C. (Assistant) and Fire Marshal	2 Sergeants (1 for Guard) from line troops
1 Captain M. A. C. (Adjutant and Asst.)	2 Buglers 6th Class
	1 Clerk 3rd Class
	1 Private 1st Cl. or Pvt. (not rated)

*Detachment Commander*

1 1st Lieut. M. A. C. (Detachment Commander)	1 Clerk 4th Class
	2 Switchboard Operators 6th Class
1 Technical Sergeant (1st Sergeant)	14 Privates 1st Cl. or Pvt. not rated
1 Sergeant	(Misc. duty pool)

*Personnel and General Records*

2 Staff Sergeants	1 Clerk 3rd Class
2 Sergeants	

*Religious Ministrations and Recreation*

1 Chaplain	1 Pvt. 1st Cl. or Pvt. not rated
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*Registrar and Detachment of Patients*

1 1st Lieutenant M. A. C. (Registrar and C. O. Det. of Patients)	1 Sergeant
1 Technical Sergeant	1 Sanitary Tech. 3rd Cl. (S. and W. Clerk)
1 Staff Sergeant (Det. of Patients)	1 Sanitary Tech. 5th Cl. (S. and W. Clerk)

*Sorting Patients Equipment*

(Functions under supervision of Chiefs of Medical and Surgical Services)

1 Staff Sergeant	1 Clerk 4th Cl. (Records and reports)
3 Sergeants (1 for collections of valuables and money)	5 Privates 1st Cl. or Privates not rated

*Evacuation*

1 1st Lieut. M. C. (Evac. Officer)	1 Sanitary Tech. 6th Cl. (Record Clerk)
1 Staff Sergeant	
1 Sergeant	40 Privates 1st Cl. or Pvt. not rated
1 Corporal	(Litter bearers and misc. duty pool)
1 Sanitary Tech. 4th Cl. (Record Clerk.)	

*Pharmacy*

1 Pharmacal Technician 3rd Class	2 Privates 1st Cl. or Privates not rated
1 Pharmacal Technician 4th Class	

*X-Ray Service*

2 Captains or 1st Lieutenants M. C.	2 Privates 1st Cl. or Privates not rated
1 X-Ray Technician 2nd Cl.	
1 X-Ray Technician 4th Cl.	

*Laboratory*

1 Captain or 1st Lieut. M. C.	1 Laboratory Technician 6th Cl.
1 Sergeant	1 Private 1st Cl. or Private not rated
1 Laboratory Technician 4th Cl.	

*Medical Service*

- |  |   |
|--|---|
| 1 Lieut. Colonel M. C. (Chief of Service Med. Sorting Officer) | 3 <i>Clinical Technicians</i> 6th Cl.                   |
| 2 Major M. C. (Professional Services)                          | 3 Privates 1st Cl. or Pvt. not rated (5 Hospital Wards) |
| 5 Captains or 1st Lieuts. M. C. (Prof. Serv.)                  | 10 <i>Clinical Technicians</i> 4th Cl.                  |
| 1 Staff Sergeant (Supervisor)                                  | 5 <i>Clinical Technicians</i> 6th Cl.                   |
| 2 Sergeants (3 Evacuation Wards)                               | 5 Privates 1st Cl. or Pvt. not rated (2 Shock Teams)    |
| 6 <i>Clinical Technicians</i> 4th Cl.                          | 4 <i>Clinical Technicians</i> 5th Cl.                   |

*Surgical Service*

- |   |  |
|---|--|
| 1 Lieut. Colonel M. C. (Chief of Serv.) Surg. Sorting Officer                         | 2 <i>Surgical Technicians</i> 4th Cl.                      |
| 4 Major M. C. (Professional Services)   | 2 <i>Surgical Technicians</i> 6th Cl. (2 Dressing Teams)   |
| 11 Captains or 1st Lieuts. M. C. (Prof. Serv.)  | 2 <i>Surgical Technicians</i> 4th Cl.                      |
| 1 Staff Sergeant (Supervisor)   | 2 <i>Surgical Technicians</i> 6th Cl. (5 Evacuation Wards) |
| 4 Sergeants (Sterilizing Room)  | 10 <i>Clinical Technicians</i> 4th Cl.                     |
| 1 <i>Surgical Technician</i> 4th Cl.  | 5 <i>Clinical Technicians</i> 6th Cl.                      |
| 2 <i>Surgical Technicians</i> 6th Cl. (4 Operating Teams increased to 16 as required) | 5 Privates 1st Cl. or Pvt. not rated (15 Hospital Wards)   |
| 4 <i>Surgical Technicians</i> 4th Cl. (2 Splint Teams)                                | 30 <i>Clinical Technicians</i> 4th Cl.                     |
|   | 15 <i>Clinical Technicians</i> 6th Cl.                     |
|   | 15 Privates 1st Cl. or Pvt. not rated                      |

*Dental Service*

- |   |                                     |
|---|-------------------------------------|
| 2 Captains or 1st Lieuts. D. C. (Prof. Serv.) | 2 <i>Dental Technicians</i> 4th Cl. |
|---|-------------------------------------|

*Quartermaster and Utilities*

- |  |   |
|--|---|
| 1 Captain Q. M. C. (Quartermaster)                 | 1 <i>Electrician</i> 4th Cl.              |
| 1 Staff Sergeant                                   | 1 <i>Mechanic</i> 3rd Cl.                 |
| 1 Sergeant   | 1 <i>Mechanic</i> 4th Cl.                 |
| 1 Corporal   | 1 <i>Mechanic</i> 6th Cl.                 |
| 1 <i>Property Tech.</i> 4th Cl. (Tech. Supply)     | 1 <i>Carpenter</i> 5th Cl.                |
| 1 <i>Property Tech.</i> 5th Cl. (Non-tech. Supply) | 3 Privates 1st Cl. and Privates not rated |

*Transportation*

- |                             |                                |
|-----------------------------|--------------------------------|
| 1 Sergeant                  | 3 <i>Chauffeurs</i> 6th Cl.    |
| 3 <i>Chauffeurs</i> 5th Cl. | 2 <i>Motorcyclists</i> 6th Cl. |

*Messes*

- |   |                                   |
|---|-----------------------------------|
| 1 1st or 2nd Lieut. M. A. C. (Mess Officer) | 2 <i>Cooks, Hospital</i> 2nd Cl.  |
| 1 Staff Sergeant                            | 2 <i>Bakers</i> , 4th Cl.         |
| 2 Sergeants                                 | 5 <i>Cooks, First</i> 4th Cl.     |
|   | 7 <i>Cooks, Assistant</i> 5th Cl. |

*Detachment of Nurses*

1 Chief Nurse (1st Lieut.)  
1 Dietitian (2nd Lieut.)

48 Nurses (2nd Lieut.) Wards, Operating Room, Housekeeper, etc.

## THE GENERAL HOSPITAL

The General Hospital is an institution of a thousand beds designed for the definitive treatment of sick and wounded. During the World War this class of hospital was known as the Base Hospital. They are fixed establishments usually remaining at their original locations throughout the period of combat operations. They usually pertain to the communication zone at the rate of one for each division of combat troops. Their exact location in the theater of operations or home territory depends entirely upon the extent of the military operations and the distance from the home territory. They are housed in permanent structures, such as schools, hotels, barracks, industrial plants or former hospitals, or specially constructed buildings, and while normally caring for a thousand patients are capable of crisis expansion to twice that capacity. Where circumstances permit general hospitals are grouped into hospital centers which facilitates their administration and provides for more extensive specialization within the center.

The General Hospital should be organized and equipped so as to furnish the maximum degree of comfort possible under the conditions of war. General hospitals receive patients by hospital train direct from the evacuation hospitals at the front. Those located nearest the zone of combat frequently receive pre-operative cases, while those at a greater distance receive cases that have been operated at the evacuation hospitals or surgical hospitals in the combat zone.

Cases that require special treatment and are not likely to be fit for service for a considerable time or will be permanently incapacitated for further military duty are evacuated to the Zone of the Interior (home territory). Those recovering from their wounds are transferred either to convalescent hospitals or replacement depots or turned over direct to military authorities for return to the front. The general principle is to give definitive treatment to every case until it is definitely determined that the patient will be unfit for military duty.

The functioning of these hospitals, therefore, clearly indicates the necessity of a highly specialized corps of professional men trained in medicine, surgery and allied specialties, and requires of

the commanding officer an equally high degree of administrative and executive ability.

TABLE W. MEDICAL DEPARTMENT, GENERAL HOSPITAL (1,000 BEDS)  
(War Strength)

Unit, one general hospital	Commissioned officers	Remarks
Colonels.....	1	
Lieutenant Colonels.....	2	(d) Dental Corps.
Majors.....	1d 9	(q) Quartermaster Corps.
Captains.....	1q 28	(a) May be Medical Administration or Sanitary Corps.
Lieutenants.....	3d 1c	(e) Chaplain.
Total Commissioned.....	40	(e) Twenty (20) may be Student Nurses.
Nurses.....	120e	(b) Includes 91 Privates 1st Class, 183 Privates.
Master Sergeants.....	1	
Technical Sergeants.....	2	
Staff Sergeants.....	11	
Sergeants.....	17	
Corporals.....	7	
Privates 1st Class and Privates, inclusive	274b	
<i>Specialists' Rating.</i>		
Bakers.....4th.....	(2)	
Carpenters.....5th.....	(2)	
Chauffeurs.....5th.....	(5)x	
Chauffeurs.....6th.....	(4)x	
Clerks.....3rd.....	(2)	
Clerks.....4th.....	(1)	
Cooks, Hospital.....2nd.....	(6)	
Cooks.....4th.....	(8)	
Cooks, Assistant.....5th.....	(16)	
Electricians.....4th.....	(1)	
Mechanics.....3rd.....	(1)	
Mechanics.....4th.....	(1)	
Mechanics.....6th.....	(2)	
Messengers, Motorcycle.....6th.....	(3)x	
Plumbers.....5th.....	(1)	
Switchboard Operators.....6th.....	(2)	
Med. Dept. Tech.....1st.....	(3)	
Med. Dept. Tech.....2nd.....	(2)	
Med. Dept. Tech.....3rd.....	(3)	
Med. Dept. Tech.....4th.....	(53)	
Med. Dept. Tech.....5th.....	(6)	
Med. Dept. Tech.....6th.....	(22)	
Miscellaneous (not rated).....	(128)	
Total enlisted.....	312	
Aggregate.....	472	
Ambulances, Motor.....	4x	
Trucks, $\frac{3}{4}$ -ton, Cargo.....	1x	
Trucks, 1 $\frac{1}{2}$ -2 ton, Cargo.....	1x	
Trucks, 3-5 ton, Cargo.....	2x	
Cars, Motor, 5-passenger.....	1x	
Motorcycles with side cars.....	3x	
Bicycles.....	2	
<p>(d) Dental Corps. (q) Quartermaster Corps. (a) May be Medical Administration or Sanitary Corps. (e) Chaplain. (e) Twenty (20) may be Student Nurses. (b) Includes 91 Privates 1st Class, 183 Privates.</p> <p><i>Summary of Specialists' Ratings</i></p> <p>1st Class.....3 2nd Class.....8 3rd Class.....6 4th Class.....66 5th Class.....30 6th Class.....33</p> <p>Total.....146</p> <p><i>Detailed Summary of Medical Department Technicians</i></p> <p>Specialists, 1st Class: 1 Pharmacal Technician. 1 Laboratory Technician. 1 X-Ray Technician.</p> <p>Specialists, 2nd Class: 2 Surgical Technicians.</p> <p>Specialists, 3rd Class: 1 Pharmacal Technician. 1 Sanitary Technician. 1 Laboratory Technician.</p> <p>Specialists, 4th Class: 1 Sanitary Technician. 1 Pharmacal Technician. 1 X-Ray Technician. 1 Laboratory Technician.</p> <p>40 Clinical Technicians. 3 Surgical Technicians. 3 Dental Technicians. 3 Property Technicians.</p> <p>Specialists, 5th Class: 1 Sanitary Technician. 5 Property Technicians.</p> <p>Specialists, 6th Class: 1 Sanitary Technician. 1 Surgical Technician. 20 Clinical Technicians.</p>		

(x) Authorized only when hospital is operating separate from a Hospital Center. When a part of a Hospital Center, transportation needs in vehicles and personnel are supplied from Ambulance Companies and units of the Motor Transport Service, Quartermaster Corps, serving the Hospital Center

## GENERAL HOSPITAL (1000 BEDS)

## APPROXIMATE DISTRIBUTION OF PERSONNEL

*Administration*

1 Colonel M. C. (Commanding Officer)	1 Staff Sergeant
1 Major M. C. (Executive Of., Fire Marshal)	1 Sergeant (For Guard of which are furnished from line)
1 Captain M. A. C. (Adjutant)	1 Clerk, 3rd Class
1 Master Sergeant (Sergeant Major)	2 Privates 1st Cl. or Pvt. not rated

*Detachment, Medical Department*

1 1st Lieut. M. A. C. (Detach. Commander)	1 Clerk, 4th Class
1 Technical Sergeant (1st Sergeant)	2 Switchboard Operators, 6th Cl.
3 Corporals	2 Buglers, 6th Class
	61 Privates 1st Cl. or Pvts. not rated (Misc. duty pool)

*Personnel and General Records*

1 Staff Sergeant	1 Clerk 3rd Class
1 Sergeant	4 Privates 1st Cl. or Pvts. not rated

*Registrar and Detachment of Patients*

1 1st Lieut. M. A. C. (Registrar and C. O. Detachment of Patients)	1 Sanitary Tech. 3rd Cl. (S. and W. Clerk)
1 Technical Sergeant	1 Sanitary Tech. 5th Cl. (S. and W. Clerk)
1 Staff Sergeant (Detach. of Patients and Receiving Ward)	2 Privates 1st Cl. or Pvts. not rated
1 Sergeant	

*Religious Ministrations and Recreation*

1 Chaplain	1 Private 1st Cl. or Pvt. not rated
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*Professional Services*

## Reception and Evacuation

1 Captain or 1st Lieutenant M. C.	1 Sanitary Tech. 4th Cl. (Records)
1 Staff Sergeant	1 Sanitary Tech. 6th Cl. (Records)
1 Sergeant	2 Privates 1st Cl. or Pvt. not rated
2 Corporals	

*Pharmacy*

1 Pharmacal Technician, 1st Class	1 Pharmacal Technician, 4th Cl.
1 Pharmacal Technician, 3rd Class	1 Private 1st Cl. or Pvt. not rated



*X-Ray Service*

1 Major M. C.	1 <i>X-Ray Tech.</i> , 4th Cl.
1 <i>X-Ray Tech.</i> , 1st Class	1 Private 1st Cl. or Pvt. not rated

*Laboratory Service*

1 Major M. C. (Chief of Service)	1 <i>Laboratory Tech.</i> , 3rd Cl.
1 Captain or 1st Lieut. M. C.	1 <i>Laboratory Tech.</i> , 4th Cl.
1 Staff Sergeant	1 <i>Laboratory Tech.</i> , 6th Cl.
1 <i>Laboratory Tech.</i> , 2nd Class	2 Pvts. 1st Cl. or Pvts. not rated

*Medical Service (10 Wards)*

1 Lieut. Colonel M. C. (Chief of Service)	2 Sergeants
	20 <i>Clinical Tech.</i> , 4th Cl.
2 Majors M. C.	10 <i>Clinical Tech.</i> , 6th Cl.
7 Captains or 1st Lieuts. M. C.	20 Privates 1st Cl. or Pvt. not rated
1 Staff Sergeant (Supervisor)	

*Surgical Service (10 Wards and Operating Room)*

1 Lieut. Colonel M. C. (Chief of Service)	1 <i>Surg. Tech.</i> , 6th Cl. (Steril. Room)
3 Majors M. C.	2 <i>Surg. Tech.</i> , 2nd Cl. (Operating Room)
8 Captains or 1st Lieuts. M. C.	2 <i>Surg. Tech.</i> , 4th Cl. (Operating Room)
2 Staff Sergeants (Supervisors)	
3 Sergeants	20 <i>Clinical Tech.</i> , 4th Cl.
1 <i>Surgical Tech.</i> , 4th Cl. (Steril. Room)	10 <i>Clinical Tech.</i> , 6th Cl.
	20 Privates 1st Cl. or Pvt. not rated

*Dental Service*

1 Major D. C. (Chief of Service)	3 <i>Dental Tech.</i> , 4th Cl.
3 Captains or 1st Lieuts. D. C.	1 Pvt. 1st Cl. or Pvt. not rated
1 Sergeant (Supervisor)	

*Detachment of Nurses*

1 Chief Nurse (1st Lieut.)	1 Assistant, Operating R. (2nd Lt.)
1 Assist. Chief Nurse (2nd Lieut.)	1 Dietitian (2nd Lt.)
1 Housekeeper (2nd Lieut.)	20 Head Nurses (2nd Lt.)
1 Night Supervisor (2nd Lieut.)	20 Night Nurses (2nd Lt.)
1 Day Supervisor (2nd Lieut.)	42 Nurses—General Duty (2nd Lt.)
1 Head Nurse, Operatg. R. (2nd Lt.)	

*Supply and Utilities*

1 Captain Q. M. C. (Quartermaster)	1 <i>Mechanic</i> , 4th Cl.
2 1st or 2nd Lieuts. M. A. C.	2 <i>Mechanics</i> , 6th Cl.
2 Staff Sergeants	1 <i>Plumber</i> , 5th Cl.
4 Sergeants	2 <i>Carpenters</i> , 5th Cl.
3 <i>Property Tech.</i> , 4th Cl.	1 <i>Electrician</i> , 4th Cl.
5 <i>Property Tech.</i> , 5th Cl.	24 Privates 1st Cl. or Pvt. not rated
1 <i>Mechanic</i> , 3rd Cl.	

*Transportation*

1 Sergeant	4 <i>Chauffeurs</i> , 6th Class
5 <i>Chauffeurs</i> , 5th Cl.	3 <i>Messengers</i> , <i>Motorcycle</i> , 6th Cl.

*Messes*

1 1st or 2nd Lieut. M. A. C. (Mess Officer)	2 <i>Bakers</i> , 4th Cl.
1 Staff Sergeant (Mess Sergeant)	2 <i>Cooks</i> , <i>Hospital</i> , 2nd Cl.
2 Sergeants	5 <i>Cooks</i> , <i>First</i> , 4th Cl.
2 Corporals	7 <i>Cooks</i> , <i>Assistant</i> , 5th Cl.



# THE USE OF DESICCATED BLOOD SERUM IN THE SELECTION OF DONORS FOR TRANSFUSION

By WILLIAM D. GILL, M.D.

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RECENT simplification in the technique of blood transfusion has eliminated many of the difficulties which formerly prevented its extensive therapeutic application, and with improvement in the tests for selection of donors, the operation has come into greater favor and the dangers incident to the introduction of an incompatible blood into a recipient's veins have been materially lessened. If the red cells of a blood introduced into an individual's veins are agglutinated after introduction, a reaction is certain to follow which may assume serious proportions and even threaten the life of the individual. Instances are on record to prove that such an occurrence has been followed by death of the recipient. The danger from this source makes it a necessity to as carefully determine the compatibility of the two bloods as it is to rule out transmissible diseases.

Landsteiner (1), Moss (2) and others, after examining the blood of numerous individuals in respect to their agglutinating reactions, have found that they may be classified into four definite groups. These observations have been of great value in simplifying the selection of the proper donor for blood transfusion and have made it possible to classify prospective donors in advance and prepare a record from which the proper donor may be selected in case of emergency, the only other determination necessary being the classification of the individual to be transfused.

The laboratory worker has been confronted with a problem in preserving the necessary serum with which to perform these tests. Fluid serum is ordinarily used for performing the test and is usually preserved by the addition of some substance such as phenol or glycerin, or a combination of the two. Sanford (3) has devised a method, a modification of the Moss test, in which he uses serum dried on ordinary cover glasses for the purpose. This method necessitates the employment of numerous cover glasses and involves a considerable expenditure of time and energy, especially if a considerable number are prepared. We have found that an equally advantageous measure has been to dry the blood serum and store it in hermetically sealed containers and place a small amount of it in solution with normal saline when needed for a test. In this manner we avoid the use of serum to which more or less objectionable preserva-

tives have been added and eliminate the features of cloudiness, precipitation and unsightliness which are evident in serum which has been preserved by the addition of chemicals.

The preparation of dried blood serum is simple and is as follows: The blood is collected in a small amount of 5 per cent solution of sodium citrate and the serum separated from its cellular constituents by centrifuging. It is then placed in large platters before an electric fan and in a surprisingly short time will be reduced to a gummy mass which is collected and placed in a desiccator over anhydrous calcium chloride and allowed to remain for twenty-four to forty-eight hours, after which time it will be found in hard, dry lumps. These lumps are reduced to a fine powder and stored in a perfectly dry bottle, which is sealed to exclude the air by coating the neck and cork with melted paraffin. The finished product is a finely divided, odorless, yellow powder which is completely soluble in normal saline solution. To reproduce the original concentration of the fluid serum 0.065 gram of the dried serum is required per cubic centimeter of normal saline solution; a slight deviation from exact measurements is of no practical importance. Blood serum dried under the conditions described above and preserved in hermetically sealed containers has been used with satisfaction at the end of six months, its agglutinating power at that time being practically unchanged. Kohlmer (4) states that serum dried under *ordinary* conditions is satisfactory only for a period of two weeks when carefully preserved in a refrigerator.

To determine the blood group to which an individual belongs the following test is used: Two or three drops of the blood of the individual to be tested are collected in about 6 c.c. of 5 per cent solution of sodium citrate. This gives a suspension of red blood cells highly diluted and evenly distributed. A loopful of this cell suspension is mixed with a drop of the previously prepared serum of a Type 2 individual on one end of a glass slide, and a similar preparation is made on the opposite end of the same slide using serum from a Type 3 individual. After ten minutes the preparation is observed under the microscope using the one-sixth objective. The following table taken from War Manual No. 6 shows the reaction manifested by the various blood groups. It will be observed that it is only necessary to use serum of types two and three in order to classify all types of blood.

*Group I* (5 per cent of individuals):

Serum agglutinates cells of no other group.

Cells agglutinated by sera of Groups II, III and IV

As donors may be used for Group I only.

As recipients may receive from Groups I, II, III and IV.

*Group II* (40 per cent of individuals):

- Serum agglutinates cells of Groups I and III.
- Cells agglutinated by sera of Groups III and IV.
- As donors may be used for Groups I and II.
- As recipients may receive from Groups II and IV.

*Group III* (10 per cent of individuals):

- Serum agglutinates cells of Groups I and II.
- Cells agglutinated by sera of Groups II and IV.
- As donors may be used for Groups I and III.
- As recipients may receive from Groups III and IV.

*Group IV* (45 per cent of individuals):

- Serum agglutinates cells of Groups I, II and III.
- Cells agglutinated by NO group.
- As donors may be used for Groups I, II and III.
- As recipients may receive from Group IV only.

From the above table it is evident that individuals in Group I are *universal recipients*, that is, they may receive blood from any group, and individuals of Group IV are *universal donors*, but can receive blood only from an individual of their group. Matters are therefore greatly simplified by having a record on hand at all times of available donors of Group IV, as they are instantly available for use without the otherwise necessary classification of the recipient.

We have found that the method prescribed for dessicating sera in the U. S. Pharmacopea, IX Revision, to be unsuited for the purpose under consideration in this article.

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## REPORT OF A CASE OF PRIMARY INTRAVASCULAR TUMOR; PROBABLY A SPINDLE-CELL SARCOMA<sup>1</sup>

BY ANFIN EGDAHL, M.D., ROCKFORD, ILL.

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THE ONLY excuse for reporting this tumor is that it might have a bearing on the old question of what is the nature of primary intravascular neoplasms. Are they all endotheliomata or are none endotheliomata? Or, have we primary endotheliomata and primary sarcomata or primary tumors of other types of cell structure occurring intravascularly? All these views have, or have had, in the past their advocates.

The following case has been a very interesting subject for study, as it presented unusual features as to history and, also, as to pathological findings.

*Case History:* Family history; no history of tuberculosis, cancer, nervous diseases, or any diseases that resembled syphilis.

*Personal History:* Has always enjoyed good health. No history of syphilis or gonorrhea.

*Present Illness:* Nine years ago, noticed a nodule on front of right wrist near middle line. This was about the size of a pin-head and was freely movable. At end of first year it had attained the size of a pea; at end of second year it had doubled in size. The tumor grew steadily until about two years ago, when it had attained the size of a golf ball. Since then, it has grown rapidly and has shot out a long, tortuous branch, extending nearly to elbow, which in turn has smaller tortuous branches. One of these smaller branches extends up over back of thumb. There has been no pain or any inconvenience of any kind until two weeks ago, when the wrist began to ache and the forearm began to show a reddish-blue color.

*Examination:* A general examination, including the sense organs and reflexes, reveals nothing abnormal. An examination of the tumor shows a mass on anterior aspect of right wrist, about the size of a small apple. From this a thick, tortuous branch extends up over forearm almost to elbow. This in turn has several smaller tortuous branches, one of which extends up over back of thumb. No pain is produced on pressure, and no pulsation is felt. The overlying skin is of a reddish-blue color. No enlargements of epitrochlear or axillary glands is noticed, or of any other lymphatic glands. A complete blood examination, including Wassermann, was negative. An X-ray was taken of forearm, wrist and hand to see if there was any possibility of involvement of bones, but this was negative.

Judging by the history, a diagnosis of a malignant tumor was made, and operation was advised. Dr. T. A. Johnson operated and was surprised at the ease with which the tumor was removed. A portion of

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<sup>1</sup>Read before the Chicago Pathological Society, March 14, 1921.

the base extended deep into the wrist, but this shelled out just as easy as the rest of the growth. The tumor was found to be composed of veins filled with a firm, solid growth, but towards the tapering points the growth slipped easily out of the veins, as a finger out of a glove.

*Gross Pathology:* The tumor presented a most curious appearance, resembling somewhat the body and radiating arms of a small cuttlefish. The total length is  $29\frac{1}{2}$  cm. The length of body or main portion of tumor is  $7\frac{1}{2}$  cm., and its width at the widest portion is  $4\frac{1}{2}$  cm. The length of the main branch is 22 cm. There are three smaller branches, springing from the main branch, being respectively 4 cm.,  $5\frac{1}{2}$  cm., and  $4\frac{1}{2}$  cm. in length, counting from the body. From these in turn spring one or more shorter branches. The width of the main branch at its widest portion is  $1\frac{1}{2}$  cm. This tapers gradually to a blunt point about  $\frac{1}{2}$  cm. in width. Along its course are a few nodules. The first side branch is  $1\frac{1}{4}$  cm. in width and tapers rapidly to an obtuse point. It, in turn, has two small side branches. The second branch is nodular in appearance and has two short branches. The widest nodule is 2 cm. in width. The third branch tapers gradually to a blunt point  $\frac{1}{8}$  cm. in width. This, in turn, has two small branches. The body of the tumor has a mottled appearance, being in places of a bluish color, in other places grayish-blue in color; evidently the blue areas are caused by an accumulation of blood underneath the capsule of the growth. This bluish color extends in places up the main branch of the tumor, but, aside from this, the grayish color is the predominant color present. The whole tumor is of a firm, elastic consistency. The entire growth is covered by a glistening capsule. On the branches, this can be stripped off easily; on the body it seems to be firmly adherent in places. At the cut ends of the smaller processes it can be stripped back like a cuff. On cutting into the main body of the tumor from above downwards, the knife passes first through the membrane and the adherent tumor mass, then through an area containing small blood vessels filled with blood, then into a cavity filled with blood running the length of the main tumor mass. This cavity varies from  $\frac{1}{4}$  to  $\frac{1}{2}$  cm. in width and is bounded below by the capsule, which is evidently the wall of a vein. The same firm, elastic consistency and grayish color are noticed in the growth as described before. Sections made in the branches also show the same appearance and consistency, but no accumulation of blood is noticed, aside from that in small bloodvessels in the tumor tissue itself.

*Microscopic Examination.*—Sections from different parts of the growth were examined. All showed as the predominant cell a spindle-shaped cell. These cells were arranged in twisted bundles, which ran in different directions, so that, in any given slide, cells could be seen in cross-section or in longitudinal section. The outline of these cells was not sharp. The protoplasm was of a uniform consistency, while the nucleus appeared to be finely granular and in most sections showed a well-defined nucleolus. The nucleus was fairly large; mitotic figures were not numerous. In the older part of the tumor considerable degeneration was in evidence in various places, particularly toward the center of the tumor. In all parts of the growth new-formed capillaries

can be found, and a thin, delicate stroma is present in a number of the sections examined. The capsule is found to show the histological characteristics of a vein. It is evident, then, that we have to deal with an intravascular tumor.

On close examination of the older part of the growth it is found that the tumor has taken its origin from the wall of a blood-vessel. Since this is the case, the question as to whether this tumor should be classed as an endothelioma or not at once becomes evident. I have gone over the literature of about fifteen so-called intravascular endotheliomata, several of which duplicated the case in question. My first diagnosis was that of spindle-cell sarcoma, but later I was for a time inclined to consider this case an endothelioma, basing my diagnosis on the history and the possibility of pressure on the confined cells, within the vein, causing the cells to take on the spindle shape so evident in the sections and on the faculty of endothelial cells to assume the characteristics of fibroblasts.

On further investigation, after having obtained the opinion of Professor Zeit, I came to the conclusion that the most probable diagnosis was a spindle-cell sarcoma and that the site of origin was in the wall of the vein. Cells were found that could be called endothelial cells, but when two or more tissues are present in a tumor it is necessary to decide their relative importance or if one or more represents metaplasia or degenerative changes in the other. MacCallum (1) states that it is unfortunate that many tumors, whose origin and histogenetic relations are difficult to trace, are classed under endotheliomas, especially if they occur in unusual sites. In practically no case has the origin of a tumor from endothelium been proven. Ribbert (2) states that the continuity of the tumor with endothelium is not proof enough. It is also possible for a tumor growing into channels to stimulate the endothelium to growth as in the case of a foreign body, but this does not necessarily mean their participation in the tumor growth. As far as I have been able to ascertain, Golgi (3) was the first to give the name of endothelioma to these growths within blood and lymphatic vessels. This was in 1869. Since then, a number of contributions to the literature of intravascular growths have been made, particularly by Borman (4), Ravenna (5), Duffard (6), MacCallum (7), Waldeyer (8), Zeit (9) and Ribbert.

Duffard believes that endothelial cells of bloodvessels may give rise to intravascular endothelial tumors. Ravenna believes that the reason for the great difficulty in making a definite diagnosis is due to the fact that these tumors are scarcely ever seen at an early stage. Nevertheless, in the tumor in question, the histological characteristics favor the diagnosis of spindle-cell sarcoma so strongly that the only possibility of its being an endothelioma would be on the assumption that the endothelial cells have assumed the shape of spindle cells and appeared as fibroblastic elements, which they may at times do. A study of sections from different parts of the tumor would not, however, warrant the statement that this had taken place here. There was no evidence of mucoid or amyloid degeneration so characteristic of endotheliomas. Clinically speaking, the diagnosis would now seem to favor a spindle-cell sarcoma, as Zeit states that an endothelioma is not so likely to metastasize as a



sarcoma, but is more likely to recur locally after removal. In this case it has not recurred locally, but within the last month a small, firm growth has developed on the angle of the right lower jaw. This is perfectly painless and has been of slow growth.

#### CONCLUSIONS

1. This tumor is an intravascular growth, showing as the predominant cell a spindle-shaped cell. There are a few cells present which have the appearance of endothelial cells.

2. In my opinion, we are dealing with an intravascular spindle-cell sarcoma of the large cell type, taking its origin in the wall of a vein. This view is strengthened by the appearance of what may be a metastatic nodule at the angle of the right lower jaw. A roentgenogram of the chest shows a nodule of fair size to the left of the hilus. This nodule is somewhat larger than the usual peri-bronchial lymph-node of a chronic tubercular infection, and may possibly be a metastatic nodule.



## DEAFNESS

BY MAJOR A. G. WILDE

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ONE OF the most difficult situations that ordinarily confronts the average medical officer is when he is called in any capacity to pass upon the physical fitness of a man, whose only evidence of disability is deafness.

The three factors on which his ultimate decision must depend are: (1) To what extent is the hearing defective? (2) To what form of derangement is the deafness due? (3) What is the prognosis as to the ultimate outcome?

The third point, or that of prognosis, is the one on which not only the patient but the disability board lays the greatest stress, and that, unfortunately, is the very one where our opinions are usually the least reliable. This is due to the total lack of any scientific method of prophesy regarding the outcome of the case in hand, we being restricted entirely to giving the results of the average case suffering from a pathological process of the same nature. Naturally, under these circumstances, statements regarding any one individual are always hazardous, as the individual frequently does not run true to form. Hence attempts at prognosis should be made only in the most general terms, stress being laid on the average case of like nature, rather than upon the identical one under discussion.

Our present methods of stating the extent of defective hearing leave not a little to be desired. That they are far from uniform is shown by the widely divergent results obtained by successive examiners on the same patient, at intervals close enough together to eliminate the not unusual periodic variations in hearing found in the same individual.

It is evident, therefore, that efforts should be made to standardize as nearly as possible our hearing tests, in order that the results obtained may be intelligible and uniform throughout the service.

Until this is done, there will continue what we not infrequently find at present, i.e., the careful findings of one board being refuted by the equally careful findings of another.

A test of the hearing is the most difficult, and at the same time the least satisfactory, of any we are called upon to make. This is because the results are almost entirely subjective and are dependent upon the cooperation of the patient. We can give positive evidence of undoubted value that the one under examination does hear, should he be able and at the same time choose to repeat our words correctly. But our nega-

tive evidence that a man cannot hear, or can hear but considerably below normal, is of limited value, as the man for reasons of his own may prefer to give little or no evidence of hearing.

We may have reason to doubt the genuineness or the degree of a man's apparent deafness, when, for instance, we can find little or no physical evidence to support it. But, on the other hand, lack of demonstrable lesion is no conclusive evidence of normal hearing, for the most severe form of deafness arising from the middle ear, otosclerosis, is entirely without evidence on external examination. Yet the deafness is not only genuine but inevitably progressive once the otosclerotic process has begun.

However, we may elaborate the armamentarium of the ear diagnostic clinic by the addition of tuning forks, acometers, watches, monochords, coin-clicks, etc., the essential fact remains that the human ear is attuned normally to receive the human voice, and the ability to distinguish that is of more value in estimating a man's real deficiency of hearing than all the others combined. Unfortunately, however, this same human voice is the one most difficult of all to standardize, as the variations in pitch, intensity and timbre of various individuals cannot be made identical. We may possibly develop some form of mechanical reproduction of the voice that could be arbitrarily chosen as a standard when heard correctly at a uniform distance. Nor have efforts in this line been lacking, as R. Marage of Paris in 1900 introduced a specially constructed siren which was motor driven, and compressed air produced all the vowel sounds, without overtones. The volume was measured accurately and the instrument found to be quite satisfactory for determining the acuity of hearing. In addition to the Marage siren, a personal communication from Col. J. R. Kean, M. C., states that while in the office of the Surgeon General he had considerable correspondence with Dr. W. S. Bryant of New York, who at that time was working upon a standardized reproduction of the human voice in the form of the phonograph, to be used in tests of the hearing. However, after considerable experiment, Dr. Bryant was forced to abandon the problem on account of the numerous obstacles encountered. The results of the use of a mechanical device would still not be identical throughout the service, as the varying acoustic properties of the different rooms in which the tests would be applied would materially affect the results.

To render the value of hearing tests even more confused, there is another factor seldom considered but nevertheless of some importance, that being the power of concentration possessed by the one examined. Where the patient is of a flighty or erratic nature, or so anxious as to

the outcome as to be unduly nervous and excited, he may lack considerably that concentration requisite to accurate hearing.

In addition, irrespective of how acute our ears, we are also unconsciously dependent to no little degree on our eyes for a certain amount of lip reading to assist our powers of hearing. When this aid is suddenly eliminated by an aversion of the head as is practised in the hearing tests, we become acutely aware of its absence, and to compensate for its loss require additional concentration to hear accurately the faint noises and diminished tones employed.

Those who lack this faculty of concentration to a workable degree are at a disadvantage when undergoing tests, and are liable to have their powers of hearing recorded as somewhat defective when the real deficiency exists merely in their aids of hearing.

It is frequently observed that a man's apparent hearing will improve perceptibly when tested several times daily for a week. The change, however, is not so much in the actual powers of hearing, as the patient being no longer subconsciously excited by the test, his frequent exercise of the function of concentration has rendered him capable of focusing his attention to the degree required for accurate hearing. Those coming up for examination who lack any real aural pathology can frequently take advantage of this fact and make an apparent improvement in their powers of hearing by a preliminary practice in the usual tests. This not only augments their powers of concentration but renders them more acutely sensitive to auditory impressions that in the past have been habitually disregarded.

Proof of the lip reading unconsciously employed is shown by the closer attention required to hold a conversation over the phone than when face to face, or to talk with one in another room, or one who habitually speaks through his teeth with little or no lip movement. The blind compensate for the absence of lip reading by heightened concentration and perhaps augmented powers of hearing. The deaf, on the other hand, develop this normally minor factor to such accuracy that it fulfils to an extraordinary degree their lack of normal hearing.

The methods outlined for the examination of the hearing in "The Standards of Physical Examinations," A. R. 40 to 105, are about as satisfactory as any such tests can be made. However, the practice of "closing the other ear by pressing the tragus firmly against the meatus" is objectionable, as when this is done there is a distinct tone produced by the force of the pressure, and in addition a higher pitched grating noise due to the friction of the tragus on the canal. When this pressure is made by another the objection is even more marked, and it tends to

obliterate the impressions from and the powers of concentration on the opposite ear.

A better procedure is to place the hand over the ear in such a manner as to touch it as little as possible, but still so to reduce its hearing powers as to throw it largely out of function. When an ear thus occluded is turned away from the examiner, its hearing powers are very slight. Unfortunately, there is no method known of closing the canal that will absolutely prevent the entrance of all sound.

If the examiner in speaking always uses his residual air, the resulting tone will be of approximately uniform volume. Knowing by practice what should be the normal hearing distance for his voice, any deviation from it can be estimated with some accuracy. A check of the results can be made by having an assistant whose hearing is normal standing just to the rear of the patient, and instructed to nod his head when he understands the test words spoken. Variations in the two will give a fairly accurate idea of the hearing deficiency on the part of the patient. In case of doubt, tests should be repeated at intervals, both to acquaint the patient with the method of procedure and the voice of the examiner and to eliminate any apparent deafness due to excitement or lack of concentration.

In the Army and Navy, those chronic aural conditions that form so prominent a portion of civilian practice are largely absent, being replaced by the acute and the traumatic. However, even in our clinics a certain number of cases of defective hearing that have become chronic in the service are met and must be disposed of. Those characterized by chronic suppurative processes seldom present any great difficulty to diagnosis. However, in the chronic non-suppurative, the problem is by no means so simple, and the majority require observation and study over a considerable period before their real natures can be determined.

By way of assisting in not only the diagnosis but the prognosis and treatment, the following differential table has been prepared, which is intended to bring out the more important characteristics of those chronic non-suppurative conditions of the middle ear. Each bears considerable resemblance to the other, especially the hypertrophic and hyperplastic forms of otitis media, and the case that can be accurately and finally classified on the first examination is the exception, not the rule.

When otosclerosis is complicated by an involvement of the cochlea or lesions of the acoustic nerve, or by a coincident otitis media, its picture will vary somewhat from that found in the table. However, these complications are unusual, and the various points presented are those seen in the average case.

**CHRONIC TUBAL CATARRH***(Intermittent deafness)*

1. *Cause*.—Interference with nasal respiration. Presence of granulation tissue or adhesive bands in the fossa of Rosenmüller. Polypoid condition of the posterior tips of the inferior turbinates which occlude the tubal orifices.

2. *Course*.—Periods of amelioration, improving in dry weather, and relapsing during cold or dampness.

3. *Tinnitus*.—Either absent or very slight and dull during periods of impairment of hearing.

4. *Vertigo*.—None.

5. *Paracutis*.—None.

6. *Functional Tests*.—Characteristic of disease confined to conducting apparatus, i.e., slight loss of acuteness of hearing for low tones, and some increase in length of bone conduction. The ratio of air to bone conduction is never reversed in a lesion confined to the tubes alone.

7. *Examination*.—Drum retracted but otherwise normal. Post nasal space reddened and covered with mucus.

8. *Pain*.—Little or none.

9. *Symptoms*.—Stuffy feeling with sense of fullness in the ears. Sense of functional loss greater than any changes demonstrable by hearing tests. Spoken and whispered voice, watch tick and acometer slightly under normal. May have sudden relief of symptoms during swallowing or yawning, with a rush of warm air to the middle ear.

10. *Inflation*.—Gives immediate and marked relief of symptoms.

11. *Prognosis*.—Favorable as far as hearing is concerned, if cause can be removed before permanent cicatricial changes occur in the tubes.

12. *Treatment*.—Remove adenoids and correct nasal obstruction. Follow by inflation and application of argyrol or astringents to mouth and lumen of tubes. Remove granulation tissue from mouth of tubes by finger or curette. Gargle by von Tröltzsch method, i.e., lie on back so that fluid enters the epipharynx. Improve general health, especially removal to warm, dry climate.

**CHRONIC HYPERTROPHIC OTITIS MEDIA**

or

**CHRONIC MOIST CATARRHAL OTITIS MEDIA**

1. *Cause*.—Chronic inflammation of the mucous membrane of the tubes and tympanum, causing the calibre of both to be reduced. Due to recurrent attacks of mild catarrhal otitis media, or frequent rhinitis with tubal congestion, or obstructive nasopharyngeal lesions. The thickened membrane interferes with the mobility of the ossicular chain.

2. *Course*.—Slight variations with weather changes. Tends usually to very gradual but progressive impairment of hearing. If the changes are limited to the membrane of the tympanum, the deafness is slighter and less rapidly progressive. If the ossicles or oval windows are involved, the deafness comes on rather suddenly and is more pronounced in character.

3. *Tinnitus*.—Present in every case.

4. *Vertigo*.—Rare.

5. *Paracutis*.—None.

6. *Functional Test*.—At first no loss in conversational tones, only for watch and acometer. Later low tones are no longer heard, with an increase in the duration of bone conduction. High tones undisturbed. Ratio of air to bone conduction never reversed

unless fibrous or bony fixation of the stapes produces a negative Reinné. Weber test referred to the diseased or more advanced ear.

7. *Examination*.—Drum retracted. Light reflex broken. Surface dull, and frequently with calcareous thickenings of the drum membrane.

8. *Pain*.—Slight at times.

9. *Symptoms*.—Deafness with gradual onset never becoming absolute.

10. *Inflation*.—Inflation at first gives sudden and marked relief of symptoms. Later affords little or none.

11. *Prognosis*.—If recent and structural changes are slight the prognosis is favorable. In advanced cases the most to be hoped for is to prevent the deafness becoming more marked.

12. *Treatment*.—Correct naso-pharyngeal obstructions or deformities. Remove adenoids. Clear up sinus infections. Flush nasal spaces with alkaline cleansing solutions followed by argyrol, then an oily spray. Inflate tubes as long as it produces any improvement in hearing. Apply 2 per cent silver nitrate or 25 per cent argyrol to mouth and lumen of tubes. When medication fails to further relieve tubes, insure their patency by the passage of bougies for mechanical dilatation. If thick tenaceous secretions are present in the middle ear that cannot be removed through the tubes, incise the drum liberally and apply suction to remove it through the external auditory meatus.

## CHRONIC HYPERPLASTIC OTITIS MEDIA

OF

### DRY CATARRH OF THE MIDDLE EAR, OR SCLEROSIS OF THE MIDDLE EAR

1. *Cause*.—Characterized by an excessive production of connective tissue within the tympanic mucosa, which gradually contracts coincident with the atrophy of the normal tissue elements, and restricting the normal vibratory powers of the tympanum and ossicular chain. It is probably a late result of the hypertrophic type.

2. *Course*.—Deafness uninfluenced by weather conditions, and is gradually progressive.

3. *Tinnitus*.—Present.

4. *Vertigo*.—Rare, unless accompanied by labyrinthine involvement.

5. *Paracusis*.—Present in advanced stages of the disorder, and indicates poorer prognosis.

6. *Functional Tests*.—Hearing considerably impaired with loss of low tones, and increase in duration of bone conduction. Loss of hearing for the voice out of proportion to demonstrable changes in tone limits and bone conduction.

7. *Examination*.—Drum retracted even when tube is open. Thickened and lacks luster. May have calcareous deposits. Usually relaxed, and in the late stages becomes atrophic, thin and transparent. Coincidentally there is a scarcity of cerumen in the external meatus.

8. *Pain*.—Not present.

9. *Symptoms*.—Loss of conversation, watch and acometer tones. Act of mastication may increase deafness. Presence of autophony, or a reccho of one's own voice heard in the ears after speaking.

10. *Inflation*.—Inflation at first gives slight improvement. Later, as stapes becomes involved in adhesive processes, no effect is produced. There is never any effect if the tubes are already open.

11. *Prognosis*.—Unfavorable as to the establishment of normal hearing.

12. *Treatment*.—Establish patency of the tubes if closed by inflation or mechanical dilatation. Post-nasal douches of warm alkaline cleansing solutions. If the tubes are

fully open, inflation is contraindicated, as it produces increased relaxation of the drum. Improve general health, especially anemia. Practice lip reading.

#### OTOSCLEROSIS

1. *Cause*.—The bony capsule surrounding the labyrinths is the seat of a gradual replacement of the normal structures by spongy bone, leading to deafness of varying degrees, depending on the portion involved. Cause unknown.

2. *Course*.—Usually in women, and displays a tendency to run in families. Not influenced by weather conditions.

3. *Tinnitus*.—Always present.

4. *Vertigo*.—Usually present.

5. *Paracusis*.—Present.

6. *Functional Tests*.—Loss of acuteness of hearing for conversation, watch and acometer. Low tones always lost with the upper tone limit normal, or nearly so. Bezold's triad symptoms present (1) loss of low tones, (2) negative Reinné, (3) increased duration of hearing by bone conduction. These, presenting no evidence of tympanic disease or derangement of the auditory nerve, mean otosclerosis with stapedial fixation. As further proof Gelle's test is positive, i.e., condensation of air in the meatus exerts no influence on the intensity of sound heard by bone conduction. This indicates fixation of the stapes.

7. *Examination*.—Drum normal. Canal and tympanum of diminished sensibility when touched with a feather or cotton strand. Yellowish-red glow or pinkish discoloration of promontory if visible through the tympanum.

8. *Pain*.—None.

9. *Symptoms*.—A gradual bilateral increasing deafness with head noises. Each successive child-birth seems to make condition worse.

10. *Inflation*.—Tubes normal and open. Inflation has no effect.

11. *Prognosis*.—Usually hopeless. When it begins late in life, it may progress so slowly as to never reach the point of absolute deafness.

12. *Treatment*.—Try phosphorus Grm. .0003 t.i.d. for several months, also thyroid extract. Take Wassermann. Potassium iodide Grm. .320 t.i.d. for 25 to 30 days, repeated two or three times a year. Outdoor life. Improve general health, and especially correct any anemia. Learn lip reading.





# STUDY OF THE SCHICK REACTION AND THE TOXIN-ANTITOXIN IMMUNIZATION AGAINST DIPHTHERIA<sup>1</sup>

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THERE is undoubtedly more definite information available in regard to the cause, treatment and prevention of diphtheria, at present, than of any of the other acute communicable diseases. This knowledge of diphtheria has been greatly increased by the development and perfection of the Schick test and the active immunization against diphtheria by means of the toxin-antitoxin mixtures. Before considering these important developments of our knowledge of diphtheria, it is interesting to consider briefly the history of this disease.

There is no definite record of diphtheria to be found among the records of the Ancients. It was, however, probably known in Egypt, Syria and Palestine in ancient times, for reference is made in the Babylonian Talmud, which transmitted the old Jewish tradition, to an angina which resembles diphtheria. Aretaeus, at Rome, gave the first accurate account of pharyngeal diphtheria at the end of the first century. He did not describe an epidemic at this time, and it would appear that the disease was purely sporadic and probably imported from Egypt. Aetius gave a more accurate description, in Mesopotamia, during the middle of the sixth century and described post-diphtheritic paralysis.

The first record of epidemic diphtheria dates from the sixth century, when several observers report epidemics of a disease, which was probably diphtheria, under various names. These cases were described chiefly in Rome.

In 1581 an epidemic, which was undoubtedly diphtheria, developed in Spain and continued until 1618 over the entire Iberian peninsula; later this epidemic spread to Italy. Many Spanish and Italian observers gave detailed reports of the disease as it appeared at that time, which agree very closely with our present knowledge of diphtheria. In 1642 this epidemic subsisted and did not again appear until the end of the seventeenth century. This epidemic was very widespread; starting from the Ionian Islands it spread through Italy, Spain, France and Holland, ex-

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<sup>1</sup>Thesis submitted by Major Francis E. Gessner, M. C., U. S. A., Post-Graduate course in Preventive Medicine, Army Medical School, 1921.

tending to England during the middle of the eighteenth century and at the same time to Switzerland, Germany and Sweden. Simultaneously it appeared in America, where an epidemic is recorded in New York City in 1771-72.

Up to this time diphtheria was confused with croup, but during the epidemic of the eighteenth century several observers considered it an independent disease, which conferred immunity after recovery and depended on a pathogenic agent circulating in the blood of the patient.

In 1818 Breteneau determined that this epidemic disease was a specific disease and gave it the name "diphtherite." His work was confirmed by Trousseau in 1828, and he added the theory that the throat condition was a local manifestation of a general disease.

Following along with the advances in bacteriology, Klebs discovered the causative organism of diphtheria, and in 1882 Loeffler cultivated the diphtheria bacillus and satisfied Koch's three postulates of specificity in 1884. In 1887-88 Loeffler also succeeded in obtaining the poison which he claimed to be the disease-producing agent of the diphtheria bacillus. Roux and Yersin reached the same conclusions in 1888, and in 1889 Kolisko and Paltauf, working independently, succeeded in separating the poison from the bacillus. In 1890 Frankel and Von Behring began work on active immunity of animals, using a broth culture of diphtheria bacilli which had been killed by heating to 60° C. By this means they were able to immunize animals, but the serum of these immunized animals failed to protect guinea-pigs from a lethal dose of diphtheria toxin. Further experiments of Von Behring and Wernicke in 1892 were more successful, for they found that by immunizing animals with increasing doses of toxin these animals became highly immune and their serum protected other animals from diphtheria infection. This work of Von Behring and Wernicke revolutionized the treatment of diphtheria and, as a result, the antitoxin treatment of diphtheria is the accepted method of treatment at the present time.

Further studies with antitoxin elicited the fact that, in addition to its value as a curative measure, persons exposed to diphtheria could be immunized by a prophylactic dose of diphtheria antitoxin. This passive immunity was, however, of short duration, lasting only four to six weeks, due to the rapid elimination of the heterologous serum containing the antitoxin. It was further observed that a few individuals developed a severe and sometimes fatal reaction following moderate doses of heterologous serum containing

the antitoxin. It was also recognized that certain persons normally had diphtheria antitoxin circulating in the blood stream and hence never developed diphtheria, although repeatedly exposed to highly virulent infections. For this reason many preferred to wait until symptoms developed and then treat the disease, rather than administer a prophylactic dose of antitoxin with possible serious results.

In 1909 Schick, while working with the Von Pirquet reaction, observed that a similar reaction could be produced by using diphtheria toxin instead of tuberculin. By estimating the amount of diphtheria antitoxin in the blood of normal persons, by the Romer method, he determined that those persons who had a certain amount of diphtheria antitoxin circulating in their blood failed to give this reaction with diphtheria toxin, and that those who had little or no diphtheria antitoxin circulating in their blood produced the typical local reaction. The first method of producing this reaction was by superficial abrasion of the skin, as in the Von Pirquet reaction, but Schick soon found that more accurate results were obtained by the injection of a known amount of the toxin intracutaneously, and this method is in use at the present time.

Following the introduction of antitoxin, Von Behring continued his research in active immunization against diphtheria. As a result of this work it was learned that animals could be immunized by subcutaneous injections of slightly toxic mixtures of diphtheria toxin and antitoxin. Von Behring and Park were both successful with this method, and Theobald Smith even suggested the possibility of immunizing children in this manner. The subject remained in this status until Von Behring succeeded, in 1912, in immunizing human beings by means of toxin-antitoxin mixtures. Park and Zingher, in this country, have been particularly successful with this method of active immunization against diphtheria.

The Schick test furnishes a highly accurate method of determining individual susceptibility to diphtheria and of differentiating carriers of diphtheria bacilli, from actual cases of the disease. The technique of the Schick test, as performed at present, is practically the same as that recommended by Schick in his original article. A standardized toxin of relatively high toxicity is diluted to such a strength that 0.2 c.c. will contain exactly  $1/50$  of a minimal lethal dose for a 250-gram guinea-pig. (Schick uses a toxin of such a dilution that 0.1 c.c. contains 1.50 M. L. D.) With a fine hypodermic needle and an accurate, leak-proof, graduated syringe,

0.2 c.c. (150 M. L. D.) of the diluted toxin is injected into the skin. The anterior surface of the forearm is usually selected as the site of injection. The same amount of this dilute solution of toxin, which has been heated to 75° C. for five minutes, is injected into the other forearm as a control. When properly injected, a pearly white bleb appears around the site of injection. One of four types of reaction may result from these injections: (1) Positive reaction, (2) negative reaction, (3) negative pseudo reaction, or (4) positive combined reaction.

When the test is to be positive, a distinct area of redness and slight induration 1 to 2 cm. in diameter slowly appears around the site of the injection of the toxin. This begins to appear in about twelve to twenty-four hours, the area of redness and induration is very sharply circumscribed, reaching its height in about three to four days. This gradually disappears, leaving a definite, circumscribed area brownish pigment and distinct scaling, which persists for three to six weeks. The control shows no reaction after the effect of the trauma has subsided and the bleb absorbed, which takes place in a very short time. The skin surrounding the injected area appears perfectly normal. This reaction indicates that the individual tested has insufficient antitoxin in the blood to protect against diphtheria, non-immunity and susceptibility.

In a test which is to be negative, the bleb or wheal produced by the injection in both arms absorbs rapidly and no inflammatory reaction is seen, except the slight amount produced by the trauma of the operation. The appearance is like that of the control in a positive reaction. This result indicates that there is sufficient antitoxin in the blood to protect the individual against diphtheria infection, immunity and non-susceptibility.

The negative pseudo reaction appears much earlier than the positive reaction, within six to eight hours, reaching its height in twenty-four to forty-eight hours and disappears in two to three days. This local skin reaction is less sharply circumscribed, is more indurated, and leaves little or no pigmentation and no scaling. The control gives the same reaction as the actual test. This reaction indicates immunity to diphtheria infection, as in the negative test, and is caused by the sensitiveness of the individual to the protein of the diphtheria bacilli which produces a slight, local, inflammatory reaction of short duration.

The positive combined reaction follows the course of the pseudo reaction in both arms for the first twelve to twenty-four hours,

after which the positive reaction is superimposed in the test arm and the pseudo reaction in the control disappears. This type of reaction indicates susceptibility to diphtheria infection, as in the positive reaction. It is a pseudo reaction followed by the typical positive reaction.

For the proper performance of the Schick test, careful technique in the operation and accurate reading of the result are of the greatest importance. The needle used must be fine, the syringe accurately graduated to deliver the proper dose, and properly ground to prevent leaking of the diluted toxin solution.

The toxin is prepared from a broth culture of diphtheria bacilli, high in toxin-producing qualities. The culture of diphtheria bacilli is grown at 37° C. for six days. To this culture 10 parts of 5 per cent phenol solution is then added to a sufficient amount of the suspended culture to make 100 parts. This aids in the killing of the diphtheria bacilli. The mixture is then allowed to stand in the ice-box for two to three days to permit sedimentation of the organisms. The supernatant fluid is then drawn off and passed through a Berkfeld filter. Since a considerable amount of toxin is converted into toxoid in the first twelve to twenty-eight months, particularly during the first six months, the clear filtrate is permitted to stand or ripen for one year, after which it is standardized. To each 100 minimal lethal doses of this standardized toxin, sufficient normal saline solution is added to make 10 c.c.; this is the primary dilution. This solution keeps well in the ice-box for about two weeks. For use in making the test, this primary dilution is further diluted with normal saline solution, so that 0.2 c.c. will contain exactly 1/50 minimal lethal dose of the toxin. This final dilution deteriorates more rapidly and is made fresh each day, or as required for the tests. The proper preparation, standardization and dosage of the toxin are of great importance, since the Schick test is an approximate quantitative reaction. In heating the toxin for the control test, the toxic properties are destroyed, leaving the other ingredients of the solution unchanged. The pseudo reaction, therefore, will show up as well in the control as in the actual test.

The Schick test depends on the local reaction in the skin, caused by the irritation of the minute dose of diphtheria toxin injected. For its proper interpretation, it may be readily seen, the injection of the toxin must be into the skin and not under the skin.

To determine the accuracy of the Schick test, many investigators

have checked the results of large series of tests, by means of the Romer subcutaneous guinea-pig injection test, for determining the amount of antitoxin in the blood. All the tests have indicated that, to obtain a negative Schick test, it is necessary for the individual tested to have not less than  $1/30$  unit of diphtheria antitoxin per cubic centimeter of blood. This amount of antitoxin is just sufficient to neutralize the dose of toxin injected in performing the test and therefore inhibits the irritative action of the toxin. Larger amounts, of course, inhibit the reaction in the same manner. In exactly the opposite manner, if the individual has less than  $1/30$  unit of antitoxin per cubic centimeter of blood, the toxin injected in performing the test is not completely neutralized, or in case of no antitoxin in the blood not neutralized at all and the local irritation of the toxin produces the positive inflammatory reaction. The presence of a very small amount of antitoxin in the blood, but insufficient in amount to protect the individual, may produce a very faint positive reaction, and such a reaction should be read as a positive test. In other words, a positive Schick test indicates that less than  $1/30$  unit of antitoxin per cubic centimeter is present in the blood, and a negative test indicates the presence of not less than  $1/30$  unit of antitoxin per cubic centimeter of blood.

Von Behring, Park and others have definitely determined that persons having  $1/30$  unit of diphtheria antitoxin per cubic centimeter of blood are immune to diphtheria infection. Von Behring believes that  $1/100$  unit of antitoxin will protect from infection, but  $1/30$  unit per cubic centimeter appears to be a safer low limit and is generally accepted. From these observations it appears that the Schick test definitely divides individuals into two classes: first, those who have sufficient normal antitoxin in the blood to render them definitely immune to diphtheria; and second, those who have insufficient normal antitoxin in the blood to protect and are susceptible to diphtheria.

Further observations have elicited the fact that carriers of diphtheria bacilli are all immune to the disease and produce a negative Schick test. These carriers are persons who have had diphtheria and become immune as a result, or have had repeated exposures to the disease and repeated, mild, unrecognized infections with the diphtheria bacillus extending over a sufficiently long period of time to produce immunity. Persons attacked by diphtheria always give a positive Schick test at the onset of the disease, which indicates non-immunity and therefore infection on exposure

to a virulent organism. Many individuals who have suffered from diphtheria fail to develop immunity to the disease, but immunity is always developed in protracted cases, such as tube cases, in which the infection extends over a long period of time. In such protracted cases the patient, by the very nature of the condition, is subjected to repeated doses of the toxin, which gradually produces immunity. This is also observed in the active immunization against diphtheria where the immunity develops very slowly and does not begin to appear for a period of six to eight weeks after the treatment.

The Schick test, then, is a very accurate method of determining individual immunity and susceptibility to diphtheria infection. By means of this test the immunes may be separated from the susceptibles and, in cases of an outbreak, the susceptibles will be known and can be quickly immunized, which is, of course, unnecessary in the case of those already immune. Individuals showing a positive culture of diphtheria bacilli from the nose or throat may also be separated into those who have the disease and those who are carriers by means of the Schick test, which, as stated above, is negative in the cases of carriers and positive at the onset of the disease.

The Schick test has also been of great value in determining the degree and permanency of the immunity conferred by active and passive immunization methods. Passive immunity by means of diphtheria antitoxin has been found to be almost immediate in its effect and may even interfere with the Schick test if the test is made and the antitoxin given at the same time. This immunity is, however, of short duration in a majority of cases, as evidenced by a positive Schick test in from four to six weeks after the injection. The active immunity produced either by the disease itself, or by diphtheria toxin-antitoxin injections, is relatively slow to develop but is of a more permanent nature. It does not develop for a period of six to eight weeks, but is still present after several years and probably lasts for life in many cases. This observation is of great value and indicates that, when immediate immunization in the presence of an outbreak of diphtheria is desired, susceptible individuals must be immunized by a prophylactic dose of diphtheria antitoxin, because of its immediate effect. It also indicates that, during a period when there is no immediate danger of diphtheria infection, the active immunization by means of the toxin-antitoxin mixture is to be chosen, since its effect is of much longer duration. Numerous investigators, using the Schick test, have determined

that up to six months of age infants are almost always immune to diphtheria and give a negative result with the Schick test. This immunity rapidly disappears after the sixth month, and at the end of one year 60 to 70 per cent of children give a positive Schick test. The susceptibility increases in the age group 1 to 5 years, when 65 to 75 per cent of the children are susceptible to diphtheria and give a positive Schick test. The greatest susceptibility appears at about 3 years. After the fifth year susceptibility gradually diminishes, and the age group 6 to 10 years shows 30 to 60 per cent with positive Schick test, 11 to 15 years, 20 to 50 per cent with positive Schick test; and 15 to 40 per cent of adults give a positive Schick test. These results agree with the susceptibility rates as shown by clinical experience.

Immunization of animals against diphtheria, by means of diphtheria toxin-antitoxin mixtures, had been recognized for a long time, but it was not until 1912 that Von Behring first attempted to produce active immunization in human beings by this method. Since Von Behring's report of successful use of toxin-antitoxin mixtures, numerous investigators, but particularly Park and Zingher, have developed this treatment to a highly satisfactory and efficient degree. They have been able to produce a satisfactory degree of immunity in 90 to 95 per cent of individuals treated, and the method has proved of great value, particularly in children, who are readily rendered immune to diphtheria without severe reactions being produced by the injections.

The toxin-antitoxin method of immunization against diphtheria consists in the subcutaneous injection of a slightly toxic mixture of diphtheria toxin and anti-toxin on three occasions at seven to ten day intervals. For the successful performance of the treatment, great accuracy is required in the preparation and standardization of the toxin and antitoxin to be used.

A strong, well-ripened and carefully standardized toxin is prepared in the same manner that the toxin for the Schick test is prepared, but is not diluted. A toxin of such a strength that 1 L dose is contained in 0.4 c.c. to 0.2 c.c. is suitable for the toxin-antitoxin mixture and efficient for active immunization against diphtheria. A highly concentrated antitoxin, with accurately determined strength, is also necessary for the preparation of the mixture.

The diphtheria toxin-antitoxin mixture used for active immunization against diphtheria, is prepared in such a manner that it



contains 85 per cent of 1 L dose for each unit of antitoxin or, in other words, 1 L dose of toxin to each 1.17 unit of antitoxin. This mixture is slightly toxic, since it requires 1 unit of antitoxin to neutralize 66 to 75 per cent of 1 L dose of toxin. The toxin-antitoxin mixture thus prepared is then allowed to stand for two days, after which it is cultured for sterility and tested for toxicity. For the toxicity test 1 c.c. of the mixture is injected subcutaneously into a 250-gram guinea-pig and 5 c.c. into another. A properly prepared mixture will produce only a slight induration at the site of the injection of the 1 c.c dose followed by late paralysis and a more marked reaction at the site of injection of the larger dose followed by acute death (five to six days). To produce active immunity in susceptible individuals 1 c.c. of the toxin-antitoxin mixture, described above, is injected subcutaneously and repeated at seven to ten day intervals until three such doses have been administered. For children under 1 year 0.5 c.c. of the toxin-antitoxin mixture is ordinarily used. A more or less severe local and constitutional reaction may follow these treatments which is ordinarily mild but may be severe and produce a temperature of 102° to 104° F. Mild reactions are usually observed in children under 5 years, so mild in fact that it is not noticeable, but the more severe type of reaction is found in older children and adults.

The records of cases treated with diphtheria toxin-antitoxin according to this method, show a very satisfactory result. As high as 90 to 95 per cent of individuals treated with the full course or three injections, have developed a high degree of immunity to diphtheria within eight to ten weeks, as demonstrated by the Schick test and the Romer subcutaneous guinea-pig injection method of estimating antitoxin. Of a large series of cases (over 40,000) treated by Park over 90 per cent have developed a sufficiently high degree of immunity, within three months after the treatment, to protect them against diphtheria infection. In all of the cases which it has been possible to follow over a period of six years (over 2,000), immunity has persisted for that length of time. Many cases which failed to develop immunity after the first series of injections have been given a second series of three injections from three to six months after the first treatment. Practically all of these cases have been successfully immunized after this second treatment. These observations definitely prove that a very permanent immunity to diphtheria, covering a number of years and prob-

ably life in many cases, is produced by the subcutaneous injection of a slightly toxic mixture of diphtheria toxin and antitoxin.

When the toxin-antitoxin immunization against diphtheria was first used, several mixtures were experimented with, one of which contained a slight excess of antitoxin, another was a mixture which was exactly neutral, and the third mixture was practically the one now in use, which is slightly toxic. Experiments with these mixtures proved that a larger percentage of persons were immunized with the slightly toxic mixture than with any of the others, and this mixture has been adopted for practical use. In his early work Park found that only 25 to 30 per cent of his cases developed immunity within four to six weeks and endeavored to improve the mixture by adding, to the slightly toxic mixture, killed diphtheria bacilli. With this mixture he found that a much larger number of his patients had a severe reaction, due to the bacterial protein contained in the mixture, and soon discontinued the use of killed bacilli in toxin-antitoxin mixtures. Later observations on his first series of cases proved the toxin-antitoxin immunization much more valuable than his early observation indicated, for he found that fully 90 per cent of his original cases, which it was possible to examine six months to one year after the treatment, showed a negative Schick which indicated immunity to diphtheria, as against 25 to 30 per cent after four to six weeks had elapsed between treatment and test. This observation corresponds to our knowledge that diphtheria immunity develops very slowly but is permanent.

The reaction following the injection of diphtheria toxin-antitoxin mixtures varies greatly with the age of the individual treated. Children from six months to six years of age have little or no reaction beyond the slight local redness and tenderness, but older children begin to develop a slight constitutional reaction which increases steadily with the age, while adults frequently have a local and constitutional reaction lasting several days and may develop a temperature of 102° to 104° F. This severe type of reaction seems to be due to the general sensitiveness of the individual to the diphtheria bacillus protein and the protein of the culture media. Persons who develop the pseudo reaction with the Schick test appear to be more liable to a severe reaction following the toxin-antitoxin treatment than those who do not develop this reaction.

The length of time required to develop immunity by the diphtheria toxin-antitoxin treatment makes it impracticable for use

when there is immediate danger of diphtheria, such as occurs during an outbreak of the disease. At such a time the prophylactic dose of diphtheria antitoxin should be given to all susceptible individuals to derive the benefit of the immediate immunity which it produces. The toxin-antitoxin mixture produces very little immunity when given with the prophylactic dose of antitoxin, for the antitoxin neutralizes the slight excess of toxin contained in the mixture. The toxin-antitoxin immunization is of greatest value in the absence of an outbreak of the disease when it is desired to permanently immunize the inmates of an institution, hospital or school. A highly immune population is thereby obtained.

Park, who has done more work with the toxin-antitoxin immunity against diphtheria than any other person in this country, has immunized large numbers of school children from the public schools in New York City, and his results have been very satisfactory. There have been no serious results following any of the injections and only a moderate number of severe reactions, these chiefly among adults and older children. As a result of his wide experience with this treatment he has come to consider all children under 3 years of age as susceptible to diphtheria and gives the toxin-antitoxin treatment without making a preliminary Schick test. Children from 3 to 5 years of age he also considers highly susceptible and gives the first injection of toxin-antitoxin mixture and makes a Schick test at the same time. If the Schick test gives a positive result he completes the course of three injections, but if the Schick test is negative no further treatment is given.

Until very recently it was considered that the toxin-antitoxin mixture was quite stable and remained suitable for use for a period of at least six months. Recently it has been found by Park that this idea is erroneous, for he found that the toxin is much less stable than the antitoxin when the two are mixed and the toxin deteriorates much more rapidly than the antitoxin. As a result of this rapid deterioration of the toxin the slightly toxic mixture of toxin-antitoxin becomes neutral, after a few months, and later contains a slight excess of antitoxin. Such a mixture which has become slightly antitoxic, it was learned early in the use of these mixtures, is not suitable for the production of a high percentage of immune persons. It will be seen, then, that the toxin-antitoxin mixture must be fresh to produce the maximum number of immune persons. This feature of the treatment is rather unfortunate, for, unless some means is found to stabilize the mix-

ture, it will not be practicable to commercialize the product and its use will be limited to those who have adequate facilities for the preparation of fresh mixtures.

Park also attempted to immunize by means of only two injections of the diphtheria toxin-antitoxin mixture, but his results were far less successful than with three injections. With two treatments only he was able to immunize only 33 per cent of one series of cases and 46 per cent of a second series of cases, and he determined that three injections of diphtheria toxin-antitoxin mixture were required for maximum benefit.

The toxin-antitoxin method of immunization against diphtheria is, then, a highly satisfactory treatment, particularly for the treatment of children, and produces a high degree of immunity within eight to ten weeks after treatment. The chief value of the treatment is to immunize susceptible individuals in schools, institutions and crowded localities, when there is no immediate danger of infection. The treatment has no value for the treatment of actual cases of diphtheria or for the immediate immunization of susceptible individuals who have been exposed during an outbreak of the disease.

The toxin-antitoxin immunization as used extensively by the New York Board of Health in treating all susceptible school children, has proved of great value in lowering the diphtheria morbidity rate among the classes treated and, if continued, will render a greater portion of the population highly immune to diphtheria. Park does not insist upon administering the toxin-antitoxin treatment to susceptible adults, because of the severe reactions which usually occur among that class of persons.

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# POST-MEASLES PNEUMONIA<sup>1</sup>

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## INTRODUCTION

ANY study of measles pneumonia must necessarily deal largely with material compiled during 1917 and 1918 in our great army camps, both because of the large number of cases and the relative accuracy of these data compared to that available from civilian sources. In 1917, for troops serving in the United States, measles stood first as the cause of death for enlisted men, this being almost entirely from the occurrence of secondary pneumonia. That little progress has been made in the control of this disease will be appreciated by comparing the experience of 1917 to Sydenham's description of an epidemic of measles occurring in London in 1670 which he describes in part as follows:

In the beginning of 1670 the measles appeared as is usual and increased daily till the approach of the vernal equinox, when it came to its height; after which it abated in the same gradual manner, and went quite off in July following. . . . The measles therefore disappear on the eighth day. . . . For it is observable that the fever and difficulty of breathing increase at this time and the cough becomes more troublesome, so the patient can get no rest in the day, and very little in the night. Children chiefly are subject to this bad symptom which comes on at the declension of the disease . . . whence arises a peripneumony, which destroys greater numbers than the smallpox or any of its concomitant symptoms.

## EPIDEMIOLOGY

*Prevalence.*—In 1917 there were 47,573 cases of measles among enlisted men in the United States Army in the United States, and following these there were reported 2,075 cases of pneumonia, while in 1918 there occurred 38,447 measles with 1,301 post-measles pneumonias, an incidence rate per 1,000 measles of 43.6 in 1917, and 33.8 in 1918. These pneumonias are described as lobar or bronchial in type, but it is evident that this differentiation was frequently incorrect and that many of the so-called lobar pneumonias were in reality diffuse bronchopneumonias. Statistics on the prevalence of pneumonia following measles in civil life are

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<sup>1</sup>Thesis submitted by Major Paul E. McNabb, M. C., U. S. A., Post Graduate Course in Preventive Medicine, Army Medical School, 1921.

very difficult to obtain because of lack of uniformity in reporting this disease and the fact that the death is charged to pneumonia without reference to an antecedent measles. Craster reports 1,000 measles cases occurring in immigrant children with an incidence of bronchopneumonia in 204 cases and lobar pneumonia in one case. These children were of all ages and had been subjected to long periods of hardship and crowding, so may be considered as presenting an abnormally high complication rate.

*Race.*—In 1917 there were 35.9 pneumonias per 1,000 colored soldiers with measles and 43.8 per 1,000 in the white race. In 1918 the colored rate was 58.1, and the white rate was 34.7 per 1,000. The case mortality for the colored race was decidedly less than for the white soldiers. It is not justifiable to draw conclusions from these figures because the colored troops were few in number in many camps and the rate varied greatly, possibly due to local conditions.

*Age.*—Measles itself is a disease of childhood because of the universal high susceptibility to this infection, and the fact that the first exposure usually results in acquiring the disease. Because of the greater prevalence of measles in childhood it is natural to find a greater number of cases of pneumonia following the disease here also. It is also general experience that the incidence of pneumonia in the measles of childhood is higher because of the greater likelihood of any infection of the respiratory tract developing into pneumonia in the first few years of life.

*Nativity.*—The influence of nativity, by protecting the rural dweller from exposure to measles during childhood, was noted by Duncan Eve during the Civil War, and more recently by Vaughn and Palmer in a comprehensive study. Evidence that the rural individual with measles, living under army conditions, is more likely to develop pneumonia is suggestive but not conclusive, because of the many varied factors involved. The high susceptibility of southern soldiers from rural districts to all respiratory infections has been referred to frequently, and the predominance of diseases other than the common communicable diseases, in rural troops, has been partly supported by this susceptibility. It would seem that factors other than rural and urban enter into this discussion and that the influence of climate, previous malarial infection or hook-worm infestation deserve consideration. In this connection it is interesting to note that, at Camp Sevier, Vaughn and Schnabel found that of 169 cases of bronchopneumonia examined



for hook worm, 50 per cent of those found positive died, whereas only 17 per cent of those negative were fatal.

*Crowding.*—Obviously crowding existed in the army camps during the emergency and favored the interchange of bacteria from man to man. Various English observers have shown a definite increase of the meningococcus carrier rate coincident with overcrowding. The rapid rise in the percentage of streptococcus carriers among recruits in the military camps in this country may be attributed to the same cause. Crowding in the measles wards after admission to hospital is especially hazardous. Many observers have shown how readily streptococci are disseminated through a ward where cubicles and the most careful ward technique is maintained.

*Carriers.*—Measles patients who harbor *Streptococcus hemolyticus* in the throat upon admission to hospital were found to possess an apparent immunity to secondary pneumonia by the Pneumonia Commission at Camp Pike. These observers noted many cases of contact infection in the measles and pneumonia wards, however, and recommend the segregation of streptococcus carriers as determined by frequent throat cultures. This subject is treated in greater detail in a following paragraph.

#### BACTERIOLOGY

The pneumococcus, *Streptococcus hemolyticus*, and the influenza bacillus have been the organisms most frequently found in post-measles pneumonia.

*Pneumococcus.*—It has been but a few years since it was generally accepted that lobar pneumonia was an autogenous infection resulting from lowering of resistance through exposure, excessive use of alcohol, or similar causes. With the classification of the pneumococci into definite groups by immunological reactions, it was discovered that the pneumococcus commonly present in the mouth of normal individuals was not the cause of the majority of pneumococcic infections of the lungs of man, and it would seem possible that further work will more completely unravel the Group IV pneumococcus, and we may find that its presence and pathogenicity in certain epidemics of pneumonia may be explained on grounds other than that of autogenous infection. The post-measles pneumonia at Camp Sevier was universally due to the pneumococcus usually Group IV, according to Vaughn and Schnabel. Hirsch and McKinney report that the pneumonia epidemic at Camp Grant

in the fall of 1918 was largely due to the pneumococcus and the pathological condition usually found was a diffuse bronchopneumonia. The antecedent disease in this series of cases was largely influenza. At Camp Funston, infection with pneumococcus Type IV and Type II, atypical, was generally noted in the pneumonia following measles.

*Influenza bacillus.*—A consideration of the influenza bacillus in connection with this study would seem profitless, especially when one finds such a division of opinion as to the meaning of its presence in the disease influenza. Many observers, notably MacCallum, have noted the presence of this bacillus in post-measles pneumonia, and especially in the so-called interstitial type of this disease. Opie, Blake, Small, and Rivers report the influenza bacillus present in the bronchi of 41 per cent of post-measles pneumonia coming to autopsy at Camp Pike. Generally, it has been found in association with other organisms, often with pneumococci, but more commonly with *Shemolyticus*. It has even been suggested that it is only in the presence of epidemics caused by this organism that the severe epidemics of pneumonia following measles occur, and in support of this hypothesis may be noted the prevalence of infections of an influenzoid character in many camps during the height of the bronchopneumonia epidemics. This may be an explanation of the bronchopneumonia arising independently of measles in certain camps during the spring of 1918 and also of the many non-measles pneumonias occurring during the measles epidemics. The Camp Jackson epidemic of measles and pneumonia in 1920 was undoubtedly accompanied by many cases that presented the clinical features of mild influenza.

The *hemolytic streptococcus* has been most frequently described as the causative factor in this disease. A great amount of work by competent observers has been published dealing with the activities of this organism, and much has been learned of its behavior under different conditions. The interpretation of the fruits of this work, however, is exceedingly difficult. Its presence in the throats of from 5 to 20 per cent of men before enlistment or draft seems definitely established. That this percentage increases greatly after a few months of living under conditions encountered in the great army camps also seems to be generally accepted. That there is a bovine and a human type of this organism, and, furthermore, that those of human origin can be further subdivided, has been shown by Gordon and others, so that we see some very definite advances

have been made in the study of this organism. Its prevalence can be better appreciated by noting the findings of independent observers in different camps in 1917 and 1918.

At Camp Taylor a survey of the throats of incoming drafted men showed 15 per cent carrying *S. hemolyticus*, and three months later as high as 83 per cent of troops were infected. It was also found that the percentage of complications of measles increased directly with the percentage of measles admissions showing *S. hemolyticus* in the throat. Levy and Alexander in this camp report results of culture upon admission of 388 cases of measles, 77 per cent of which were positive for *S. hemolyticus*. These they have subdivided according to the number of colonies on the plate, into heavily infected, 64.8 per cent, and slightly infected, 12.3 per cent. The incidence of complications in measles cases carrying *Streptococcus hemolyticus* was 36.8 per cent, against 6.4 per cent in non-carriers. These observers also filled two wards with carriers and non-carriers placed in alternate beds with cubicle system and careful ward technique, and found at the end of one week the carrier percentage had increased from 50 to 80 per cent in one ward and to 87.5 per cent in the other.

In this series of cases 166 complications developed and these are tabulated with regard to the result of the throat culture as follows:

Complications in 388 cases of measles	Carriers		Non-carriers	Total
	Heavy	Light		
Bronchopneumonia.....	45	2	0	47
Tonsillitis, acute.....	18	7	1	26
Bronchitis, acute.....	22	1	2	25
Otitis media, purulent.....	21	1	0	22
Empyema.....	15	0	0	15
Sinusitis.....	7	3	0	10
Peritonsillar abscess.....	7	0	0	7
Erysipelas.....	6	0	0	6
Cervical adenitis.....	4	1	1	6
Peritonitis.....	1	0	0	1
Septic meningitis.....	1	0	0	1
Total.....	147	15	4	166

Cumming, Spruit and Oten report a series of 452 cases of measles in which 35 per cent were *S. hemolyticus* carriers (plate

reading and not confirmed), and of these 41 per cent developed complications. Of the non-carriers only 10 per cent were complicated. Twelve per cent of 452 cases of measles developed pneumonia; 94 per cent of these were from the carrier group and 6 per cent from the non-carriers.

Knowlton, however, reports observations in 458 cases of measles at Camp Jackson in which cultures were taken from the postnasal region instead of the tonsils, showing 26 per cent carriers. He found that 10.6 per cent of the carriers developed pneumonia and 10.4 per cent of the non-carriers, and the incidence of suppurative Otitis media was 9 per cent in the former and 9.8 per cent in the latter.

Cole at Fort Sam Houston reports 11.4 per cent of throat cultures of measles showed hemolytic streptococci upon admission, 38.6 per cent positive after three to five days in the hospital, and 56.8 per cent positive eight to sixteen days after admission. Twenty-eight suspected tuberculosis cases were cultured in one ward and 21.4 per cent were found to be carriers of this organism, as were 57.7 per cent of patients in an acute pneumonia ward. This observer states he has little doubt that the bronchopneumonia following measles at that place in February and March, 1918, was caused chiefly if not entirely by the *S. hemolyticus*.

The literature abounds with similar reports, but it is thought that the preceding observations are sufficient to establish the prevalence of this organism in the presence of an epidemic.

On the other hand, Simmons found the weekly carrier rate of attendants and patients at the Walter Reed Hospital during March and April, 1919, to be between 50 and 90 per cent, with no cases of streptococcus pneumonia. Nichols finds these streptococci no different from the *S. hemolyticus* isolated from exudates in fatal empyema or meningitis.

Pilot and Davis cultured 100 children between five and sixteen years of age with clinically hyperplastic but not markedly diseased tonsils and found 60 per cent were streptococcus carriers. These tonsils were removed and cultures from the crypts were positive for hemolytic streptococcus in 97 per cent of cases. All of these cases were free from fever or evidence of recent inflammation, nor had they subjective symptoms of sore throat.

Nichols reports the results from ordinary throat culture of 50 normal individuals with 28 per cent positives, while 50 per cent were positive when the cultures were taken from the tonsillar

crypts, demonstrating an error of 22 per cent missed cases by the ordinary methods.

The foregoing facts illustrate the difficulties encountered in ascertaining the rôle played by this organism in the production of pneumonia. Why have we an epidemic of bronchopneumonia apparently due to this streptococcus at one time and no such infections at another time, although the same etiological factor is equally prevalent? This is attributed by some as due to difference in virulence, although the reason for this difference does not seem very clearly explained. Methods have been devised which show that there are different groups of these organisms, such as we have in the pneumococcus, which may explain this variation in invasive power. Holman has classified the streptococci on the basis of sugar fermentation reactions, but this has proved of little value in determining the pathogenicity, and, serologically, complement fixation tests indicate that these streptococci are identical. More recently agglutination methods have been used to group these organisms, the results of which at least are encouraging.

Blake calls attention to the epidemic occurrence of streptococcal infections and to the fact that they are with but few exceptions secondary infections, occurring in the wake of pre-existing disease such as influenza or measles. He believes that these infections are not commonly autogenous but are contact in nature, and in support of this refers to the studies of the Pneumonia Commission at Camp Pike of which he was a member. In 867 cases of measles there were 56 pneumonias, of which 9 were due to streptococcus, 5 of them proving fatal. Thirty-seven of these measles cases gave positive throat cultures for streptococci upon admission, and at some time during their stay in the hospital 242 were positive. The 9 streptococcus pneumonias were all from the group of cases becoming positive after admission, and no case of pneumonia of any kind developed among the 37 who showed a positive admission culture.

Another point of interest, noted by Opie and collaborators at Camp Funston and Camp Pike, is that the percentage of positive admission cultures from measles throats was far below that of the camp population as a whole. At Funston 50 men in the 28th Company of the 164th Depot Brigade were cultured and 26 per cent were found positive, whereas 23 men from this company admitted to hospital with measles all gave a negative culture for *S. hemolyticus* when admitted. Cultures repeated between the third and ninth

days on these men, however, showed 17.4 per cent to be positive. In explanation, they suggest that the acute illness caused the temporary disappearance of these organisms, at least to the extent that they could not be identified by the same cultural methods that had previously proved effective.

#### CLINICAL FEATURES

The pneumonia following measles may be either lobar or broncho in character, but by far the greater number are of the latter type. Lobar pneumonia, when present, shows little variation from that encountered elsewhere and will not be discussed in this paper.

The onset of bronchopneumonia is gradual in 90 per cent of cases and it is often impossible to determine just when the bronchitis of measles becomes a pneumonia. The pneumonic process may arise on or before the appearance of the rash, or its appearance may be after convalescence is well established, even after the patient's discharge from hospital. In the majority of cases, the pneumonia develops within the first week of the disease. In a typical case the cough becomes more troublesome, the temperature continues elevated, the pulse and respiration increase and the patient becomes cyanotic. Rurah states that "when there are symptoms of bronchopneumonia, even though not marked, it is safe to assume that it is present." This is worthy of emphasis because the chest signs in the incipency of this disease are usually insufficient for a diagnosis. Rales of all description are heard scattered over both chests, and small areas of fine crepitant rales, not modified by coughing, may be found. The latter are usually first discovered over the bases posteriorly, frequently near, or between the scapulae. Rarely dullness may be found at the onset of the disease. Its presence at any time should arouse suspicion of the presence of a pleural exudate, a frequent and early complication of the streptococcal infections. Dullness may and usually does develop at some stage of the disease, especially in the cases with confluent pulmonary involvement. The differentiation of consolidation from fluid accumulations in the pleura may be impossible without an exploratory puncture, because the air passages to the diseased area may be partially blocked, diminishing the breath and voice sounds, while on the other hand one frequently encounters emphyemata which transmit bronchial voice and breath sounds with surprising distinctness. The chief reliance must be placed in dullness, displacement of the heart, and free use of the needle.

*Sputum.*—This is generally mucopurulent and easily raised. Occasionally it may be streaked with blood but is rarely rusty and tenacious as commonly seen in lobar pneumonia. The absence of this latter characteristic is of value in excluding croupous pneumonia in cases presenting signs of widespread consolidation.

*Cough.*—This is frequent and troublesome and often accompanied by persistent hoarseness.

*Pain in the side* may or may not be present. This symptom is usually less distressing than when seen in lobar pneumonia and is more easily controlled by strapping, etc.

*Temperature.*—Usually irregular and rarely as high as that of lobar pneumonia. It frequently reaches normal at some time in the 24 hours and is associated with sweating. The fever falls by lysis.

*Respiration.*—The average case has a respiration rate of 28 or 30 although it may range from 20 to 60. Rapid respiration is of bad prognostic import and often denotes a pleural complication. The breathing is labored and cyanosis is an associated symptom. Vaughn and Schnabel noted that 50 per cent of their cases showing definite cyanosis were fatal.

*Pulse.*—This is increased but not to the extent commonly seen in empyema, where its rapidity is of decided diagnostic value.

*Mental Condition.*—These patients are anxious, restless and apprehensive, but delirium is usually absent and the mental condition is often unclouded to the end.

*Course.*—This disease may continue from one to six weeks and then eventuate in recovery; or circulatory failure, toxemia, or other complications may arise at any time and cause death. The majority of fatal cases die within the first ten days or two weeks, although in some the end may come in four to six days after the initial symptoms appear.

*Complications.*—Empyema is by far the most common and important. It may develop at any stage of the disease, not rarely being present upon admission to the pneumonia ward. Mastoiditis, pericarditis, endocarditis and peritonitis may be mentioned as other life threatening conditions that occur in the course of this disease.

*Mortality.*—Among enlisted men in the United States in 1917, 45 per cent of post-measles broncho-pneumonias proved fatal; in 1918, 44 per cent of these cases died. In the epidemic of 1,000 cases of measles occurring in immigrant children arriving at the

port of New York, 66 per cent of 204 cases of pneumonia were fatal. It is realized that measles epidemics vary greatly in number and severity of complications, and the above figures are not presented as representative of the mortality of this disease under more normal surroundings and habits of life.

#### PATHOLOGY

The pathology of pneumonia following measles appears largely influenced by the organisms found associated with it—their number, variety, and invasive power. The tissue resistance of the patient may, and probably does have a hand in determining the picture found after death. The pneumonias following measles in the spring of 1918 differ but little from those seen after influenza in the fall of that year, and there were many similar cases of pneumonia arising without preceding measles or influenza, which have been explained on the basis of increase in invasive power of the causative organisms, usually streptococci, through successive human passage. The pathological conditions found may be divided into lobar pneumonia due to the pneumococcus, and bronchopneumonia caused generally by the streptococcus, and the latter may be again divided into a lobular type and interstitial type, with both varieties of which the *S. hemolyticus* is usually associated. The bronchopneumonia in the Camp Sevier epidemic is apparently an exception to this, in that the pneumococcus was almost universally present, and the streptococcus when found did not prove the same as that reported from other camps.

*Lobar pneumonia* is relatively infrequent as a complication of measles and when present corresponds closely to the usual picture of this disease.

*Interstitial pneumonia.*—In this form of bronchopneumonia, hard nodules are felt throughout the involved lung. On section, these are seen as yellowish masses projecting above the cut surface, in the center of which is a bronchiole from which a drop of pus exudes. There is frequently an effusion, purulent or potentially so, accompanying this condition and the pleural surface is covered with a fibrinous deposit, or if sufficient time has elapsed this may be organized into a layer granulation tissue. Microscopically the infected bronchioles show destruction of epithelium with superficial necrosis and deposition of fibrin upon the surface and within the tissues. The deeper tissues of the bronchial wall are infiltrated with lymphoid and plasma cells. The lumen of the bronchi show



many streptococci. The tissue immediately surrounding the bronchiols shows hemorrhage, and later lymphocytes and fibrin forming compact plugs in the alveoli. The most striking feature is the thickening of the bronchial walls and the infiltration of the alveolar walls with mononuclear wandering cells. The intervening lung tissue may be edematous and the area of lung supplied by the infected bronchus, obstructed as it is by purulent exudate, is collapsed as a result of absorption of contained air. The lymph vessels are thrombotic and teeming with streptococci and it is thought the infection extends along this route to the pleura. Later stages show marked connective tissue production and MacCallum suggests that this type of pneumonia is found in individuals who possess considerable resistance to the invading organisms. The presence of the influenza bacillus in conjunction with the streptococcus in pneumonia of this type has frequently been observed and there is a possibility that it may be a factor in the production of this pathological picture.

*Lobular pneumonia.*—In this form the consolidation bears a terminal relation to the bronchiole. One or more lobules may be involved and surrounding these patches are hemorrhagic areas. On section the lung surface is less moist and the consolidated areas appear elevated, dull or opaque, and rather granular. The bronchi and interlobular septa are less prominent and there is usually less thickening of the pleura. The lymphatic vessels are frequently enlarged and conspicuous, and the bronchi are usually filled with pus. Stained sections show the alveoli to contain leucocytes and fibrin and, in contradistinction to the interstitial type, filled with streptococci. Frequently this intensely infected tissue becomes necrotic and is seen surrounded by an extensive hemorrhagic area. Purulent bronchitis is common to both forms of pneumonia, nor is it uncommon in lobar pneumonia following measles, and frequently both lobular and interstitial changes are observed within the same lung. Abscess formation is relatively common and Opie describes as suppurative pneumonia those cases of the interstitial type that are characterized by suppuration of the interlobular septa and the occurrence of a suppurative lymphangitis.

*Empyema* is a common complication of these pneumonias. It is practically always streptococcal and is prone to occur early in the course of the disease. It is characterized by the rapid accumulation of a thin, turbid fluid rich in streptococci, which is slow

to assume the physical character of pus. The pleural surfaces rapidly become thickened and adherent with a tendency to pocket the pus.

#### PROPHYLAXIS

In the light of present knowledge of pneumonia secondary to measles, the following measures are briefly outlined in the hope of decreasing its incidence among measles patients. In general all factors that are applicable to the control of the antecedent measles will play a part in the proper management of this common complication of this disease. This discussion will consider only the handling of the measles case after reaching the hospital.

Throat culture for *S. hemolyticus* should be required of all measles patients when admitted to hospital and they should be isolated until the report of culture is received, whereupon all carriers should be assigned separate wards. These cultures should be repeated at frequent intervals and when fresh carriers are detected they should be transferred.

Measles wards should have from 100 to 200 square feet per patient and be provided with cubicles to prevent the dissemination of infective material by coughing, etc. That this is only partially effective has been repeatedly shown, in fact, it seems probable that such infection is frequently air-borne. Wards should be warm and well ventilated both day and night. There should be no sweeping, because of the chance of spreading infection through dust, and floors should be mopped daily with an antiseptic solution. Exposure of blankets to the sun or disinfection by steam and laundering of all linen should be required before use by another patient. The sheets forming cubicles around beds should be changed with each new admission.

Ward surgeons, nurses and attendants should be thoroughly conversant with measles and its problems so that they will intelligently maintain strict bacteriologic ward technique. The ward personnel should wear gowns and masks and not come in contact with patients in the pneumonia or septic surgical wards.

The prompt recognition of pneumonia when it does occur is of greatest importance. Although the rôle of the streptococcus carrier is not definitely determined, we know that the acute case of pneumonia carries organisms which have sufficient invasive power to cause the disease in himself so there is good reason to think this strain is dangerous to others. The Pneumonia Commission at Camp Pike reports instances of contact infection that stand

most critical analysis, so it would seem important to transfer these cases promptly from the general measles ward. By analogy we might safely remove all cases developing complications of any kind.

The spread of pathogenic bacteria by dishes and eating utensils has been shown to be of minor importance in diseases of the respiratory tract where soap and warm water are used in washing them. It has been customary, however, to boil these and there seems no objection to this procedure, especially as there is evidence that the typhoid-colon group may be transmitted in this manner.

In general it is the writer's opinion that all measures that offer any hope of lessening the incidence of this disease should be instituted, but that most reliance can be placed in early hospitalization of the measles patient, in careful nursing in a clean, comfortable ward and the early diagnosis and removal from this ward of complications due to the pneumococcus and streptococcus.

#### SUMMARY

Pneumonia is a common complication of measles and is highly fatal, causing practically all the deaths resulting from this disease.

The *Streptococcus hemolyticus* is usually found associated with this disease and is probably the causative agent in a large percentage of cases.

Carriers of this organism are frequently encountered among healthy men and the carrier rate increases when these individuals live in close association with each other.

The incidence of complications is greater in measles patients who are carriers of streptococci and present knowledge justifies segregating them from non-carriers.

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## STRABISMUS AND ITS TREATMENT

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THIS PAPER will be limited to consideration of comitant squint of the lateral variety. All the sixteen cases herein presented were adults appearing for treatment at the Eye and Ear Clinic, Fort Benning, Georgia, during the past year and a half. All showed a well-marked constant deviation of many years' duration, so that benefit from refraction or muscle exercises was not possible and recourse must be had to operative measures.

Cases should be first tested to determine degree of deviation for near and for distance, and power of adduction and abduction, the near point, and the field of binocular and monocular fixation. Observation should be made of any vertical deviation as this condition may underlie the development of a convergent or divergent squint. The most important information for the operator is the angular measurement of deviation for near and for distance, and tests showing the actual power of the weakened muscle. These tests show the relation and degree of convergence or divergence excess, and to what extent the weakened muscle is paretic or mechanically at a disadvantage. Cases showing full lateral excursion and alternate fixation are the most favorable for operation; six such cases in the group reported were corrected by a single operation on one eye.

Operative measures consist of tenotomy of the overacting muscle and tendon folding, advancement, or resection of the weaker muscle.

Tenotomy is rather uncertain in its results, and its technique has consequently varied. Early attempts were too conservative and ineffective; then, as a radical method developed, convergent squints were frequently converted into divergent, which were more unsightly than the original condition. The pendulum then swung to partial tenotomies, the most generally used type being that of Von Graefe or Ziegler. The center of the tendon insertion was cut and then the lateral portion of the insertion pared down till the desired weakening was obtained. The effect was further increased by making cross-cuts, one above and one below, in the muscle farther back. This procedure may be relied upon not to become excessive and will give definite results in children with small deviations of about ten degrees. It is particularly valuable in these

cases, as they are the ones most apt to show excessive results from a free tenotomy. The point of normal attachment of the muscle is preserved and the power of convergence is not impaired. Outside of this restricted group of cases, however, this partial tenotomy is insufficient, and its effect is apt to diminish during the four months following operation. All three cases in my group that required a repetition of tenotomy were done in this way during October and November, 1921. In subsequent cases I abandoned the procedure, isolating the tendon by opening a small window in Tenon's capsule just above and below the tendon and then cutting the tendon clear across, being very careful not to enlarge the small openings in Tenon's capsule. The tendon retracts about 2 millimeters and is retained nicely in its proper relation by connecting fibers to Tenon's capsule. These fibers are sufficiently strong to retain the tendon in position while the reattachment is taking place, and yet the tension pull on the resected side is entirely eliminated during this time. No excessive results have developed from this type of procedure. It would seem that excessive results following free tenotomies of the past are due to large cuts in Tenon's capsule and too free division of lateral strands of muscle attachment rather than to the complete section of the muscle tendon itself.

Tendon folding operations are mentioned only to be condemned. Their effect is uncertain, as slipping is sure to take place and we can have no idea how much. They damage the muscle tissue of the weak muscle and thereby interfere with its function later. They produce an unsightly lump under the conjunctive which is a noticeable deformity for months after and never entirely disappears. They are unsatisfactory in appearance, and disappointing in result.

Advancement is best done by the method of Oliver or Worth. The objections to advancement operation are that the position of the muscle is less secure; it can more easily slip back; there is definite danger of getting an oblique insertion and thereby interfering with the normal action of the muscle. There is a possibility of perforating the sclera as the sutures are inserted at the thinnest portion of the sclera where it is only one millimeter thick and they must penetrate the sclera to hold firm. Advancement produces an unsightly deformity which only very slowly smooths down. Numerous postmortem examinations of the tissues in these cases show that the muscle becomes adherent to the sclera between the

old and new attachments, so that mechanically the most that can be expected of a successful advancement is that it will have the same mechanical action as a resection.

Resection is unquestionably the method of choice. In all cases of long-standing squint, the weak muscle will be found at operation to have a thin band-like tendon which continues back for some 5 to 10 millimeters; then the belly of the muscle may be fairly substantial. Mechanically a far better situation results from excising the tenuous portion and bringing the belly of the muscle firmly up to a sound attachment, rather than attaching a thin band of tendon fibers to a point nearer the sclero-corneal margin. In this connection it is important to realize that the consistency and strength of this portion of muscle is a far more important guide to determine the amount of tendon to be excised than the linear deviation as shown by the strabismometer. The weaker and more attenuated the muscle, the larger the zone of resection. Likewise the variation of the angular deviation, as measured separately for near and for distance, is an important indicator. If there is a marked difference between the two, there is relative weakness of one muscle, which must be compensated for by putting it at a mechanical advantage.

In this connection, it is desirable to do the resection before the tenotomy. The operator can remove his speculum between the two procedures and test the relative position of the eyes, and thereby see how far the deviation is already corrected and how strong a pull is being exerted by the opposing muscle. This will be a guide as to how radical to make his tenotomy. The deviation should, if possible, be practically corrected at this observation. The chief value of the tenotomy is to remove all pull on the resected muscle and to allow healing to take place in about the position you have placed the resected muscle. For this reason it is important to tenotomize the strong muscle, even if your resection has apparently corrected the deviation.

I remember very well a case in point which was overcorrected by resection only. The tendon was not touched, and in a month's time the deviation had recurred. It is much the same proposition as is recognized in setting broken bones; that all muscle pulls tending to displace the fragment must be counteracted or removed in order to maintain a satisfactory position of the bone. For the same reason it is poor policy to do a tenotomy, then later a resection, or vice versa. Such procedures are frequently recommended

in the books, especially in small deviations, but the idea is radically wrong. The pull of the opposing muscle must be so blocked that the resected muscle can firmly heal in place before any continuous pull is exerted upon it. Thus the combined operation of resection and tenotomy is far preferable, even in deviations of ten to fifteen degrees, which would seem to be correctable by a simple tenotomy. The tenotomy alone is sure to be too much or too little; and whichever difficulty appears tends to grow worse as time goes by. Case ten of this series, which had previously been operated unsuccessfully by tenotomy, illustrates this point. He had an excellent result from the combined operation.

The position of the eye immediately after the operation should be such as to show a slight over-correction in divergent squint and parallelism in convergent squint. During the first few days the tenotomized side shows a slight further relaxation. In the succeeding week this is offset, and a diminution effect develops which tends to progress during the first month following operation. This is due to the fact that the tenotomized muscle is anatomically stronger than the resected one, and, once it is firmly attached, its tonic pull increases. The eye has been placed in its proper position, but it is subjected to two unequal pulls. This muscle pull must be balanced to make the effect permanent. We have placed the stronger muscle at a mechanical disadvantage, and the rest of the problem is to exercise the weaker one so that its tone will be sufficient to maintain a balance. Fortunately, this seems perfectly possible to accomplish if exercises are persistently followed in the two months following operation. They consist of lateral movements with fixation in the zone of the weaker muscle, unoperated eye to be covered. This should be done in frequent sittings of a few exercises at a time, keeping well within the limits of fatigue. Work on the muscles should be started as soon as the stitches are removed (the tenth day). If the importance of these exercises is not realized, a satisfactory correction may swing back to about its previous deviation. This occurred in case four of this series who was a man of an indifferent sort and failed to carry out the exercises or to report for observation. He was found to have about the same deviation as before operation, after a lapse of four months. His other eye was operated later and a correct balance obtained in this way. If for any reason a second operation is required in a case, a much more dependable result can be obtained by operating on the other eye and thereby avoiding the disturbance



of the many scar tissue bands and the uncertainty of how they will act during healing. Correction can, however, be obtained by reoperating the same eye, as is shown by cases five and ten, which had been previously operated unsuccessfully. They had, however, alternating fixation and good vision in both eyes which were favorable factors.

The Worth and the Reese are the best types of resection operation, and the Reese is preferable because it causes a better application of the muscle to the tendon attachment, the rent in Tenon's capsule is very smoothly closed, and the sutures are so placed as to do a minimum of trauma to the muscle and therefore do not hamper its post-operative function. Though the method of placing the sutures would appear theoretically to be less secure, in practice they hold their place very well. The resected muscle should be thoroughly freed from conjunctiva and from Tenon's capsule by careful dissection, so that it may be advanced to its new position without any adhesions or pulls hampering its full function. The careful separation from conjunctiva in the tenotomized side will prevent the annoying complication of sinking of the caruncle. Definite effort should be made to do all dissection by clear snips of the scissors and avoid all unnecessary pulls, rubs and tears of the tissues. Wiping with sponges is eliminated and the eye flushed with boric instead. By this means the post-operative reaction, with its infiltration of muscle fibers and attachment with exudate and serum and its consequent loosening of stitches, is reduced to a minimum. When this technique is carried out it is difficult to tell at the first dressing before opening the lids which is the operated eye. Bandages are removed and dark glasses substituted on the fifth day so that early use of the eye is encouraged.

The appended table shows the data in detail of sixteen cases operated at Fort Benning between December, 1920, and June, 1922, and the results obtained in each.

Of the sixteen cases, thirteen satisfactory results were obtained by single operation on one eye. Three cases needed further operation. Two of them were made satisfactory with a repetition of tenotomy, and one case required also a combined operation on the other eye. The degree of deviation ranged from ten to fifty degrees and averaged thirty degrees. Six cases had alternating fixation; six showed absence of fixation in the deviating eye, and four had potential fixation, though ordinarily using the better eye. Marked hyperopia was associated with convergent squint in four cases.

TABLE OF SQUINT CASES OPERATED AT FORT BENNING, 1921 AND 1922

Name	Type	Degree	Vision	Fixation	Special features	Operation date	Result
1. M. . . . .	Convergent	Pr. 42° LM-8M-M	20/25 3/200	Absent left	Ext. rectus left very weak T. field gone.	April 9, 1921	Excellent
2. C. . . . .	Convergent	Pr. 35° LM-7M-M	20/40 20/20	Left fixes	Eyes crossed 2 years. Struck over right eye.	Tet. reported Nov. 1921. Opr. Apr. 16, 1921	Very satisfactory
3. B. . . . .	Convergent	Pr. 35° LM-7M-M	20/30 20/20	Right usually	Eyes crossed since birth.	May 7, 1921	Satisfactory (Convergence less 5°)
4. K. . . . .	Convergent	Pr. 30° LM-6M-M	20/20 20/200	Absent left	Abd. left very weak excess of convergence.	Tet. reported Nov. 3, '21. Opr. Oct. 3, 1921	Convergence 15°. Reoperation on right eye June 28, '22. Result excellent.
5. R. . . . .	Convergent	Pr. 25° LM-5M-M	20/30 20/50	Alternating	Opr. 2 yrs. ago in N. Y.	Dec. 5, 1920	Excellent (Con- vergence less 5°)
6. V. . . . .	Convergent	Pr. 35° LM-7M-M	20/30 20/20	Alternating	Muscle action in all direc- tions good.	Nov. 19, 1921	Very satisfactory
7. W. . . . .	Convergent	Pr. 40° LM-8M-M	20/100 20/30	Absent right	Marked hyperopia Rt. with astig.	Dec. 10, 1921	Excellent
8. G. . . . .	Convergent	Pr. 50° LM-10M-M	20/70 20/100	Right fixes	Weak extrectus.	May 17, 1922	Very good
9. M. . . . .	Divergent . .	Pr. 35° LM-7M-M	20/20 20/70	Absent left	Rt., hyperopic. Left, my- opic.	June 9, 1922	Very satisfactory

10. H....	Convergent	Pr. 20° LM-4M-M	20/20 20/30	Alternating	Eyes crossed since birth. Opr. yrs. ago.	Oct. 9, 1921	Excellent (June 1, 1922.)
11. F....	Convergent	Pr. 25° LM-5M-M	20/25-2 20/30-3	Alternating	Eyes crossed since birth.	March 17, '21	Very satisfactory (Disch. May 10, 1921)
12. W....	Convergent	Pr. 10° LM-2M-M	20/25 S/200	Right fixes	Hyperopia. Rt. 11.75, Left, 3.75.	April 25, 1921	Very satisfactory (Disch. June 21, 1921)
13. L.....	Convergent	Pr. 30° LM-6M-M	20/20 20/20	Left fixes	Eyes crossed since birth.	April 21, 1921	Satisfactory (Disch. June 19, 1921)
14. H....	Convergent	Pr. 23° LM-4M-M	20/40 20/20	Alternating	Operation 3 years ago for squint.	May 14, 1921	Excellent (Disch. Feb. 14, 1922)
15. L.....	Convergent	Pr. 25° LM-5M-M	20/20 20/70	Left fixes.	Weak ext. rectus.	Tet. reported 1/7/22. Opr. Oct. 29, '21	Fairly satisfactory (Disch. June 15, 1922)
16. K.....	Convergent	Pr. 25° LM-5M-M	20/20 5/200	Right fixes. Absent left	Hyperopia both. Lime leucoma left.	April 30, 1921	Very satisfactory (Disch. Jan. 9, 1922)

Three cases had been previously operated unsuccessfully by another operator. Thirteen had had no operative work.

One frequently hears the opinion expressed among physicians and surgeons, and very widely among the public, that squint operations are usually unsuccessful and often make the condition worse. The results obtained in this series of sixteen cases, taken as they came in currently at our eye clinic without selection, show definitely this is not the case. With modern technique, satisfactory and reliable results may be obtained with reasonable certainty; and no one need go about with this unfortunate deformity who is willing to be helped.



# *The Military Surgeon*

*Published monthly and constituting two volumes annually.  
Volumes commence with the January and July numbers.*

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Entered as second-class matter January 22, 1916, in the Postoffice at Washington, D. C., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917; authorized July 2, 1918.

Subscriptions \$4.00 a year for the United States. Elsewhere throughout the world \$4.50. Single copies 50 cents. Subscriptions payable in advance. Checks should be made payable to The Association of Military Surgeons, U. S., and not to any officer personally.

*The addresses of members and subscribers are not changed except upon request.* In every case the old as well as the new address should be given. Requests for change of address must reach the Secretary before the twentieth of the month to be effective for the following issue.

Original articles, items of news and matter of interest to the Services are welcomed. Requests for reprints should be made at the time of forwarding articles.

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## DICKENS AND PSYCHIATRY

If recollection serves us, some cynical wight once said that in fiction "Disease never strikes below the belt." When it is requisite to lay the overwrought hero or heroine by the heels for an indeterminate time there is always ready at hand that dread disease, "brain fever." He, or she, never succumbs to any of the more prosaic forms of illness, such as intestinal obstruction, acute nephritis or any of the ills of man (or woman, God bless her), which lurk south of the equator. Sounds better probably to locate them more closely in relation to the tortured cerebrum. It has occurred to us that in the writings of the English novelist, Charles Dickens, there are indications that in the making of an immortal writer there may have been lost the foundations of a good alienist.

There are depicted in his writings many examples of mental (not necessarily moral) perversion. That he should have so consistently described psychic conditions, from pro-drome to the final end, makes one wonder if he had some undeveloped sense which led him unconsciously and unerringly to the portrayal of these characters. Of course all the world unites in acknowledgment of his skill in the description of individual characteristics in the word-painting of the individuals who swarm his pages. But, while it is to be conceded that a man of his fineness of insight should give us the pastels which he has of man in his right mind, it must be a subject for speculation as to the source from which he drew his

descriptions of the characters which did not sound true to the pitch and tune of rationalism.

One wonders if he had an extra-appreciative sense of the workings of a clouded mind; if he could see behind the veil of defective mentality and build his characters so skilfully along this line which we, at this later date, more clearly analyze.

Let us look at a few of them by way of illustration. In his strange and unusual work, "The Tale of Two Cities," radically different in style from anything he ever wrote, what must we conclude in respect to Dr. Manette, the prisoner of the Bastille? A case for our alienists of today most certainly; and very truly drawn. In the present time we should, without doubt, with the aid of our psychiatrists and alienists, put the afflicted doctor in his proper niche as to his mental shortcomings. Did he suffer from a fixed delusion? From one of persecution, or did he have a more innocuous trouble which might be characterized as a "habit complex"? We (the editor) do not presume to decide: but the picture is clearly drawn and the vision of the old man who inevitably returns to his vocation—avocation—of making shoes from force of habit in order to quiet mental disturbance must have significance to those versed today in the twisted workings of the human mind. Pity it is that we do not know the final outcome—what happened to Dr. Manette after his *calèche* had carried him and the unconscious Evrémond safe beyond the red terror of the vengeance of St. Antoine.

He, Dickens, leaves us there though, and we must draw our own conclusions as to whether this capable and foully injured French doctor returned to England as a hopeless maker of women's shoes or as a dignified and rational member of his profession.

How about Bill Sykes? What would a present-day jury do in his case, with the aid and advice of skilful experts along the borderland of the criminal insane and those who are right enough to hang? How about his heroic efforts in saving those in the fire after his murder of Nancy and his subsequent flight? Was he naturally and from birth abnormal, or was he a wilful criminal? What would be the verdict if he came before twelve of his peers today, skilfully defended? Was he a paranoiac or not? It is a hard question to answer. Of course he was better at the end of his rope with his bulldog on his shoulders, but was he, in view of his upbringing, instincts and training, entirely responsible before the law, both legal and medical?

Where shall we catalog "Barnaby Rudge" in that story which treats so graphically of the Gordon riots and the prison system of England at that time? Was he plain idiot, or was he a man with a vision? Someone on the borderland between sanity and a prophetic view of what was needed to set things straight?

How about Steerforth, in "David Copperfield?" The man who could stoop to seduction and every selfish passion, and then turn at the last to an act of supreme self-sacrifice? Where shall we put him? Normal, or abnormal? What was the disease of Fagin, the Jew, who taught boys to steal and then went whispering to the gallows? Was he mentally right, or did he belong in the number of those who had lacked from earliest infancy the sure knowledge of right and wrong?

Of course all those questions were settled at that time by the stern edicts of English justice, where the transgressor paid for the least infraction by an easily given life to the state, and beyond that, by the dour penalties of hanging, drawing, quartering and all the dreadful and inevitable penalties, which not only took away life, but did it deliberately, and with the utmost agony which might be exacted from the quivering body.

Enough of horrors and speculation. What we started to suggest to readers of this English novelist was that there are many characters, many situations in his novels which deal very directly with our own hazy problems which concern the responsibility of the criminal classes, either purely as such, or as mixed with a definite psychic dilution of them.

### REITERATION

Some time ago, months, we believe, we stated that we had completed an index of the some fifty volumes of *THE MILITARY SURGEON*, which represent our publication up to date, and that we stood ready to advise and help anyone of the association who needed data in regard to the preparation of a paper along technical lines; that, on request, we would send a list of articles published in *THE MILITARY SURGEON*, on the line which was of interest to the inquirer, and that we would forward to him, carriage charges to be borne by him, numbers or volumes containing such articles as he might wish to consult. In some instances this offer has been taken advantage of, but not to the extent we had hoped.

There is a wealth of material bound in the back issues, and we wish to make that available to members of the association. Any

request along this line will be very promptly acceded to, and any advice or information furnished which may help those who contemplate the preparation of papers, whether for our publication or another.

#### HOTEL RATES FOR OCTOBER MEETING

The Arlington Hotel, 1025 Vermont Avenue, authorizes the following rates for members of The Association of Military Surgeons attending the October session:

Double rooms with twin beds and bath will be \$6, \$7 and \$8, according to location, and suites of two rooms and bath accommodating four persons will be from \$10 per day up, according to location, European plan.

The Burlington Hotel quotes the following rates for our October meeting:

Single rooms with private bath will be \$3.50, \$4.00 and \$4.50 per day; double rooms with private bath \$6.00 and \$7.00 per day.

The following rates are quoted by The Cairo Hotel, 1615 Q Street Northwest:

*European Plan:* Single room with bath, \$3 to \$4 per day; Single room without bath, \$2.50 to \$3.00 per day; Double room with bath, \$4 to \$6 per day; Double room without bath, \$3.50 to \$4.00 per day.





## COMMENT AND CRITICISM

During a recent encampment of the Medical, Dental, Veterinary, Medical Administrative Officers of the Medical Department Reserve Corps, U. S. Army of the Fourth Corps Area, Camp McClellan, Alabama, July 12 to 26, 1922, Temporary Organization Medical Section, Organized Reserves, for this area was effected with Lieut. Col. Hardie R. Hays, Jackson, Miss., as acting president, and Maj. L. H. Webb, M. O. R. C., New Orleans, La., as acting secretary.

The following resolutions were passed:

We, the Medical, Dental, Veterinary, Medical Administrative Officers of the Medical Department Reserve Corps, U. S. Army, of the Fourth Corps Area, on active duty at Camp McClellan, Alabama, July 12 to 26, 1922, for the purpose of field training, being in meeting assembled and desiring to express our appreciation for the training and courtesy shown; be it

*Resolved:* (1) That we tender to the Surgeon General and subordinates, to the Commandant, Organized Reserve Corps, Camp McClellan, and subordinates, particularly the camp surgeon and his staff of trained instructors, our sincere appreciation and thanks for the competent manner in which the technical instruction was given and courtesies shown.

(2) That we go on record as endorsing this plan of training for medical officers, and hope that steps will be taken to procure the necessary funds to extend training in the future to a larger number.

(3) That we are unanimously opposed to the initial appointment of officers in the Medical Reserve Corps above the grade of first lieutenant, who were not on active duty during the World War.

(4) That we further oppose any policy that places restrictions such as age, etc., or attendance at camp and any other restrictions of medical officers' promotions which are not placed on promotions of reserved officers in the line. Attention is respectfully invited to the fact that medical officers are in civilian life practicing every day their branches, and those officers of the non-technical branches are not practicing the form of duty upon which they will be called to function in time of war.

(5) That a copy of these resolutions be submitted to the Surgeon General (through camp surgeon) and Camp Commandant, Camp McClellan, Alabama, also that copy be furnished the Journal of The American Medical Association, Southern Medical Journal, Journal American Military Surgeons, American Hospital Journal, American Pharmaceutical Journal, National Dental Journal, Military Dental Journal and American Veterinary Journal.

L. H. WEBB, Major, M. O. R. C., *Secretary,*  
*New Orleans, Louisiana.*

F. M. HARBIN, Major, M. O. R. C.,  
*Columbia, South Carolina.*

F. M. BOYETTE, Captain, M. O. R. C., *Oncida, Tennessee.*

L. H. BREVARD, 1st Lieutenant, M. O. R. C., *Hernando, Mississippi.*

## BOOK REVIEWS

THE VENEREAL CLINIC: The Diagnosis, Treatment, and Prevention of Syphilis and Gonorrhea. A Handbook of Venereal Disease in relation to the Individual and the Community, by Several Writers. Edited by Ernest R. T. Clarkson, M.A., M.R.C.S., L.R.C.P., Chief Clinical Assistant, Urogenital Department (Males), London Hospital; late Demonstrator in Human Anatomy in the University of Cambridge. With an introduction by Sir Squire Sprigge, M.D. Pp. 477. New York: William Wood & Co., 1922.

Men may come and men may go, but the *Gonococcus* and *Spirochaeta pallida* go on forever. Through centuries now gone mankind has struggled desperately to rid himself of the curse of venereal diseases, or at times, discouraged and disheartened by his failures, has lapsed into an apathetic acceptance of their ubiquity and of the hopelessness of ever bringing them to the point of complete extinction. Within recent years much—relatively—has been accomplished by the use of prophylactic measures in groups of men held under a strict military regime and trained to habits of discipline; but among civilians—unrestrained, unconstrained, indifferent, and all too lacking in general information regarding the venereal peril—the scourge of these diseases cannot yet be said to be in any great measure ameliorated. The field for endeavor is wide. Popular instruction—from the public forum, in the schools, and most importantly in the home—is a crying need, and the labor of those earnest sociologists and physicians who seek to inaugurate this movement should be warmly welcomed and seconded by all who have at heart the welfare of the race.

The work under review has had infused into it “the fundamental principle . . . that it should prove to be a stimulating and aidful handbook for the elementary student, both in respect to the medical and sociological aspects of venereal disease.” Every physician must become, concerning the venereal infections, a sociologist, for neither by treatment of individual cases nor by furnishing facilities for physical prophylaxis alone can these evils be banished from the world of men. And not only must he subscribe to the sociological measures which have in view the elimination of possibility of contamination, but he must as well, if he would do his full duty by society, become an active propagandist and endeavor upon every appropriate occasion to instruct not only his own clientèle, but likewise those wider circles of the social order with which his contact may be more formal.

“The Venereal Clinic,” beginning with a forceful introduction by the able editor of the *Lancet*, is divided in its text into two parts: Medical (Part I), and Sociological and Administrative (Part II). The first three chapters deal with syphilis in its various stages and manifestations; one chapter concerns itself with “Latent Disease and Marriage”; the succeeding one with “Congenital Syphilis”; while still another comprises a concise and definite, and therefore very useful, treatise on the treatment of syphilis.

The section on gonorrhea is introduced by a preface and an introduction, and proceeds then to describe the anatomy of the male genital apparatus, following which the “diagnosis and treatment of acute and subacute anterior gonococcal urethritis and its complications” are described. Posterior urethritis and its complications are next considered from the standpoint of diagnosis and treatment, while the remaining chapters of this section are devoted to “Metastatic gonorrhea and gonococcal rheumatism,” “Diagnosis and treatment of chronic gonorrhea,” “The urethroscope,” “Infiltrations and strictures,” and “Standard of cure.” Next a section of the book discusses in detail the subject of “Gonor-

rhea in the female." "Gonococcal affections of the eye" are studied; the "Bacteriology" and the "Laboratory diagnosis of gonorrhea" complete the textual handling of this disease.

Part II, which deals with the sociological and administrative aspects of venereal disease, lays due emphasis upon the prevalence of syphilis and gonorrhea, upon the remote results of these two infections, and upon the necessity for "A scientific and true system of notification of the cause of death—The need for international action," in order that a proper and adequate conception of the number of deaths due to venereal disease may be acquired. A tabulated statement of sociological measures applicable to the control of venereal disease includes:

I. Religious and Ethical.

II. Educational.

(1) The Medical Profession.

(a) Students.

(b) Practitioners.

(2) The General Public.

III. Medical and Physical Preventive Measures.

(a) Immediate Self-disinfection.

(b) Early Preventive Treatment.

Consideration of Respective Merits.

(c) Later or Ordinary Treatment.

(1) At Clinics.

(2) By Private Practitioners.

IV. Notification of Venereal Disease.

V. Restriction of Prostitution. Licensed Houses, etc. (See Appendix iv, p. 445.)

Each of these groups of measures is thereafter discussed in detail. The activities of societies, councils, etc., the need and aim of whose existence is to combat venereal disease, are mentioned briefly. "The relation of the medical man to patients in the venereal disease clinic, etc.," and "Legislation and the practitioner" are the matters about which the last two chapters of the book are written. These are followed by five appendices which deal with the following subjects:

Appendix I. (A). The V. D. Clinic and its Equipment—Syphilis.

(B). The Organization and Equipment of a Venereal Disease Clinic.  
Gonorrhea (Males).

(C). The Equipment of the Venereal Clinic. Gonorrhea (Females).

Appendix II. Specimen Leaflet in Relation to Immediate Self-disinfection.

Appendix III. On the Making of Dilutions from Concentrated Solutions, etc.

Appendix IV. Restriction of "Prostitution." (Continuation of Part II, Chapter II).

Appendix V. General Bibliography (A Few Selections).

The medical portion of the book contains many illustrations in colors and otherwise, admirably adapted to give the student a true—not an exaggerated—picture and conception of the various manifestations of the diseases under consideration, as well as to allow him to review, in connection with the subject being studied, the anatomy of the parts involved. This book cannot but be of value to the student in medicine and to the general practitioner; but it is likewise so composed, is so clearly and concisely expressed, and in particular deals so broadly with those aspects of the question which concern society in general, that it may well be recommended to the educated layman interested in sociological uplift as a source from which he may glean valuable information.

A. N. TASKER,  
Major, M.C., U.S. Army.

INFLUENZA: Essays by several authors. Edited by F. J. Crookshank, M.D. (Lond.), F.R.C.P. Physician: The Prince of Wales' General Hospital, The French Hospital and Dispensary, and St. Mark's Hospital, London; Consulting Physician, New End Hospital, Hampstead.

The pandemic of influenza which swept over the civilized world in 1916 and the following years found medical science almost as helpless to cope with it from the epidemiological point of view as had been the case in 1889-90. True it is that this scourge saw fit to select as the occasion for its latest attack upon the human race a time when the whole civilized world was in the grip of the most cataclysmic war recorded in history, and when, because of that war, the entire social order had been largely subverted, with the consequent withdrawal from their normal fields of activity of great numbers of physicians and health officers. Had it been otherwise, it might have been possible to institute and enforce, at least in some countries, repressive measures sufficiently drastic from the epidemiological standpoint to have held the malady in some sort of check, or, if no more, to have reduced the pandemic to the measure of more or less localized epidemics. So much is, of course, pure speculation. It implies a question to which definite answer can never now be given. But the bald fact remains that, conditions being what they were, the efforts of medical science achieved little or nothing in preventing the spread of influenza either among the civilian population of this and other countries or among the millions of soldiers gathered together to fight the battles of Europe.

War, as an abstract principle, deserves and justly receives the abhorrent condemnation of all right-thinking souls; yet there are many of the world's most terrible evils that are not entirely unmixcd. Thus, in the recent great conflict, there were brought together in the various armies groups of scientific men who found ready to their hands a vast amount of clinical material, adequate equipment, and the efficient military organization necessary for the intensive study of certain problems which could hardly otherwise have been investigated so completely and thoroughly. The present epidemiological knowledge of trench fever has been entirely developed as a result of such studies; that of typhus fever has been greatly added to; the dysenteries were inquired into exhaustively especially by the British in their Eastern Mediterranean campaigns. In considerable measure the same may be said of influenza; and out of the experiences of the medico-military men—temporary and permanent—of the World War there has been produced an enormous volume of literature dealing with this disease. Of the many books comprised within this mass of literature, the one here under consideration is "a collection of papers, written recently, by some who have given particular attention to certain lines of thought or who have had special experience of certain happenings." It is not at all a medico-military product although it gives due consideration in appropriate chapters to the statistics culled from army sources.

Beginning with some chapters on the philosophy of epidemiological study and the historical conceptions of influenza, the book presents in the fourth chapter a very exhaustive discussion of the synonymy of influenza; and this chapter is followed by one of historical research into the connection between this disease and the various encephalomyelopathies. The epidemiology and bacteriology of influenza follow, and in the discussion of the latter of these two phases of the question a very complete and very fair-minded consideration of the claims of Pfeiffer's bacillus to be the sole etiological factor in the production of this malady is the outstanding feature; but the author of this particular chapter finally gives us as his conclusion the one at present most generally accepted by bacteriologists and epidemiologists—namely, that "whatever be the cause of pandemic influenza, all the observed facts go to prove almost conclusively that it is *not* Pfeiffer's bacillus as classically described." Also it is stated that "there is not the slightest shred of evidence that the

disease is due to a so-called filter-passing virus," and the chapter closes with our present complete ignorance of the specific cause of influenza impressively suggested in the question: "What is the secret of the locked door?"

The "Clinical and Therapeutic Considerations of Influenza," its "Nervous Syndromes," the "Ocular Affections," "The Surgical Aspect," "The Complications Affecting the Throat, Nose and Ear," "Pregnancy, Labour, the Puerperium and Diseases of Women," and "The Skin Lesions" are all ably treated in detail. The book ends with a final philosophical discussion of "The Theory of Influenza," in which the various aspects of the disease as we know it and the future outlook for its repression are critically, though briefly, reviewed.

Of this collection of essays it may be said that it very fairly and accurately summarizes the present-day knowledge of influenza from all points of approach. It is not, nor does it pretend to be, either textbook or manual. It is rather a highly philosophical and highly scientific treatise on the subject, which will have great historical value in years to come and will without doubt serve as an indispensable work of reference to all who shall in the future be engaged in the investigation of the problem of this disease.

A. N. TASKER.

Major, M.C., U. S. Army.

ESSENTIALS OF LABORATORY DIAGNOSIS, designed for Students and Practitioners, by Francis Ashley Faught, M.D., Formerly Director of the Laboratory of the Department of Clinical Medicine and Assistant to the Professor of Clinical Medicine, Medico-Chirurgical College, etc., Philadelphia, Pa. Pp. 523. Philadelphia: F. A. Davis Company, 1921.

Since 1909 this laboratory manual has passed through six editions and now comes to its seventh. Its general outline follows essentially that of preceding editions, notably the sixth; but everywhere additions and amendments show that, in its preparation, current medical literature has been carefully reviewed, and that advances in physiological chemistry and the other phases of laboratory activity have been diligently followed. This book is so well known, and so widely used by medical students and practitioners alike, that a detailed account of the succession in which appear the various matters treated is not deemed necessary. Certain individual features are, however, worthy of especial notice.

The chapter on the blood has been revised and newer apparatus (for example, the Neubauer counting chamber) is featured. A separate chapter has been given to the spectroscopic examination of the blood, showing its increased importance, especially in medical jurisprudence. Chapter 5 of the new edition gives very succinct yet sufficiently detailed descriptions of the "Newer methods of blood examination." Among these the coagulation time of the blood and its viscosity are treated very much as in the previous edition; but the subject of blood chemistry is added *de novo*, and very useful textual descriptions (well illustrated) of the determination of urea, non-protein nitrogen, total nitrogen, cholesterol, alkali reserve of the blood plasma, alveolar carbon dioxide tension, and blood sugar are included.

Chapter 6, "Sphygmomanometry and Sphygmography," shows that not only is the laboratory in the ordinarily accepted sense of the term (bacteriological, pathological, chemical, and serological) treated of, but that the examining room wherein instruments of precision come into play is, as well,

within the purview of the author. Dr. Faught captured a reference to the spirochaetal cause of yellow fever, perhaps in the galley proofs, for they and Noguchi's discovery must have been nearly contemporaneous. If prophecy were a normal element of a book review, we would dare to fortell that *Leptospira icteroides* will be treated more at length in the eighth edition, and that the Seidelin bodies will be dismissed with a brief mention or perhaps disappear altogether. To the discussion of syphilis have been added four paragraphs on the culture of *Spirochaeta pallida* and its detection in tissue.

The author's classification of the more common animal parasites of man is widely at variance in the matter of terminology with the classification accepted at present by the International Commission on Zoological Nomenclature. Thus, a new genus *Endamoeba* (or *Entamoeba*) has been very generally accepted to include all parasitic amoebae. *Lamblia* has become *Giardia*. *Balantidium* and *Paramecium* are two different genera. *Distomum* has practically disappeared from the literature of helminthology. *Bothriocephalus latus* is now *Dibothriocephalus latus*. *Taenia nana* has changed its name to *Hymenolepis nana*. *Trichocephalus dispar* has been known for a considerable time as *Trichuris trichiura*. Dr. Stiles gave to the New World hookworm, first described by him, the name *Necator americanus*, and so far as is known this name has not since been changed. It is a difficult matter for those who are not zoologists to keep up with the changes in zoological nomenclature, but the attempt should be made in all medical literature. A revision of the classification here under discussion is advisable.

The microscopic examination of extracts of feces has been extended to include Schmidt's test for pancreatic insufficiency, Gross' method in determination of tryptic activity, and Hawk's modification of Wohlgemuth's method of determining amylolytic activity.

The chapter on the urine includes additional paragraphs in which are described Marshall's method (discussed in the appendix of the sixth edition) and the method of Van Slyke and Cullen for the estimation of urea, and a detailed description of the estimation of total nitrogen.

This very excellent and very valuable laboratory treatise has been carried buoyantly by the favor of professional commendation into its seventh edition. In the matter of the verdict which has been passed upon it by the whole medical world, all thumbs are up. In this latest edition the work maintains unimpaired its position in the front rank of those writings which treat of particular aids to diagnosis.

A. N. TASKER.

**SURGICAL AND MECHANICAL TREATMENT OF PERIPHERAL NERVES**, by Byron Stookey, M.D., Associate in Neurology, Columbia University; Assistant Professor of Neurology, New York Post-Graduate Medical School and Hospital. With a chapter on Nerve Degeneration by G. Carl Huber, M.D., Professor of Anatomy, University of Michigan. Octavo volume of 475 pages with 217 illustrations, eight in colors, and twenty charts. Philadelphia and London: W. B. Saunders Company, 1922. Cloth, \$10.00 net.

The book begins with a chapter on the Anatomy of the Spinal Nerves, this being followed by a chapter of great importance, Nerve Degeneration

and Regeneration, written by Dr. G. C. Huber, than whom there is no one more capable. Dr. Huber adheres to the Monogenetic Theory of Regeneration and writes in an elaborate way to build up and support the theory. In his bibliography there are forty-nine references. It is interesting to recall that in the work of Ballance and Stewart written some years ago, reference is made to the opinions of Huber and others, and their theory based upon experimental and staining methods, that "neurotisation" can only take place when the peripheral and distal segments are united, and that return of function can only occur through outgrowths of the proximal segment into the distal. This is the theory upon which the repair of nerves is founded when recommending technique in the Clinical part of the present book. Ballance and Stewart hold to the "peripheral" theory, according to which "the new fibers in the distal segment—axes, cylinders, medullary sheaths and neurilemma alike—are formed from preexisting cells in the distal segment itself," etc.

In a chapter on Methods of Nerve Repair, special effort is made to emphasize those to be discarded, the emphasis being particularly directed towards discarding every flap method. A table of twenty-three cases, giving a summary of nerve-flap operations up to 1914, shows in illustration that "not a single case, so far as may be judged from the published reports, gave any evidence of successful regeneration. Two cases which were responsible more than others for continuance of this method were totally lacking in evidence of satisfactory regeneration." The methods recommended to be used, when applicable, are end-to-end suture, nerve crossing, nerves transplantation, methods for diminishing nerve defects, mobilization, stretching, transposition and resection of bones, etc. There are chapters on tubulization, nerve liberation, and technique of nerve suture. Before beginning the surgery of the different nerves there is an illuminating chapter on Indications for Operation—the time to operate and causes of failure—and a short one on Mechanical Treatment. The remainder of the book, comprising 265 pages, exclusive of the index, is devoted to Surgery of the Facial Nerve, Brachial Plexus, Cervical Ribs, Musculo-spiral Nerve, Musculo-cutaneous Nerve, Median Nerve, Ulnar Nerve, Lumbosacro-plexus; the Sciatic Nerve and its Divisions. There is a chapter on Nerves Infrequently Injured, as the Recurrent Laryngeal, Long Thoracic, Supra Scapula, Obturator, and the Gluteals. The book is concluded by chapters on Peripheral Nerve Tumors, Causalgia, Amputation Neuroma. The illustrations were good, showing the anatomy and technique involved in the exposures; the suture methods are also illustrated.

The skeletal outline which the writer has noted of this excellent book calls attention to the wide field which it considers. The source is authoritative, scientific, and the work in happy contrast to much of the voluminous literature which has appeared during the years since the war, on a subject demanding the most careful study and sufficient clinical experience and time to base deductions which are trustworthy, and which may be employed by the careful surgeon when trying to inform himself upon this intricate, delicate branch of surgical procedure.

JOHN E. SUMMERS, M.D.

CLINICAL TUBERCULOSIS, by Francis Marion Pottenger, A.M., M.D., LL.D., Medical Director, Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California. With a chapter on Laboratory Methods, by Joseph Elbert Pottenger, A.B., M.D., Assistant Medical Director, and Director of the Laboratory, Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California. 2 vols., 8°. Second Edition. Vol. I, Pathological Anatomy, Pathological Physiology, Diagnosis, and Prognosis. Vol. II, Complications and Treatment. 1,432 pages, with 170 text illustrations and charts, and 10 plates in colors. St. Louis: C. V. Mosby & Co., 1922.

Dr. Pottenger's work on "Clinical Tuberculosis," already become a classic in medical literature since the publication of the first edition in 1917, has appeared five years later in its second edition. A comparison of the two editions shows that no new elements of real weight in this tremendously important subject—whether they have to do with etiology, diagnosis, treatment, or what not—have escaped the attention of the author and his assistants, who have, themselves, contributed so much to the advancement of the world's knowledge concerning tuberculosis.

A brief mention of a few of the differences which appear as between the first and second editions seems appropriate. Thus, in the second of the chapters which deal with "The Nervous System in Tuberculosis," the author follows the trend of change in the matter of neurological terminology in that he has substituted the phrase "Parasympathetic Division," for the previously employed term "Greater Vagus." An additional manifestation of markedly destructive tuberculous lesions is noted on page 214 under the caption of "Atrophy of Facial Muscles." In the chapter dealing with "The Diagnosis of Early Pulmonary Tuberculosis" the paragraph which in the first edition dealt with "Lagging" now concerns itself with "Diminished Motion." The subject matter of this paragraph is the same in the two editions word for word, but the latter heading is at one and the same time more inclusive and more accurate—perhaps a seeming, but certainly not a real, paradox. On page 532 of Volume I, a paragraph on "X-Ray in the Diagnosis of Tuberculosis of the Intestine" is added to the chapter on "The X-Ray as an Aid to the Diagnosis of Pulmonary Tuberculosis." To Volume I has been added an appendix in which Dr. Pottenger gives an amplified classification and grouping of symptoms as follows:

### SYMPTOMS OF PULMONARY TUBERCULOSIS

#### GROUP I

##### SYMPTOMS DUE TO TOXEMIA

*Caused by Harmful Stimulation of*

*Symptoms*

- |   |                                   |
|---|-----------------------------------|
| I. Nervous System in General.                                       | 1. Malaise.                       |
| II. Endocrin System in General.                                     | 2. Lack of endurance.             |
| III. Sympathetic Nervous System.                                    | 3. Loss of strength.              |
| IV. Sympathicotropic Endocrins, particularly adrenals and thyroids. | 4. Nerve instability.             |
|   | 5. Diminished digestive activity. |
|   | 6. Increased metabolic rate.      |
|   | 7. Loss of weight.                |
|   | 8. Increased pulse rate.          |
|   | 9. Night sweats.                  |
|   | 10. Temperature.                  |
|   | 11. Leucocytosis.                 |



## SYMPTOMS OF PULMONARY TUBERCULOSIS

## GROUP II

## REFLEX SYMPTOMS FROM THE LUNG

<i>Afferent Nerves</i>	<i>Symptoms</i>	<i>Efferent Nerves</i>
Afferent through (vagus) parasympathetics	Hoarseness.....	Laryngeal nerves.
	Laryngeal irritation.....	Superior laryngeal nerve.
	Cough.....	Laryngeal and nerves to all expiratory muscles with inhibition of nerves to inspiratory muscles.
	Inhibition of heart.....	Motor fibers of cardiac vagus.
	Increased muscle tonus and glandular secretion in gastrointestinal canal.	Motor fibers of gastric and intestinal parasympathetics.
	Flushing of face.....	Sensory fibers of trigeminus.
Inflammation of Lung	Spasm of sternocleidomastoideus and trapezius.	Accessorius.
	Deviation of tongue from median line.	Hypoglossus.
	Degeneration of facial muscles..	Trigeminus.
	Flushing of ear.....	Third sensory cervical.
	Dilatation of pupil.....	Motor from Budge's Center (lower cervical and upper dorsal).
	Spasm of muscles of shoulder girdle and diaphragm.	Cervical motor nerves, 2nd to 8th.
Afferent through sympathetics	Lessened motion of chest wall, partly due to muscle spasm as above.	Cervical motor nerves, 2nd to 8th.
	Pain above 2nd rib and spine of scapulae (superficial).	Cervical sensory nerves, particularly 3rd, 4th, and 5th.
	Pain in muscles of shoulder girdle (deep pain).	Cervical sensory nerves, 2nd to 8th.
	Degeneration of skin and subcutaneous tissue above 2nd rib anteriorly and spine of scapulae.	Cervical sensory nerves, 3rd, 4th, and 5th.
	Degeneration of muscles of shoulder girdle.	Cervical sensory and motor, 2nd to 8th.

## SYMPTOMS OF PULMONARY TUBERCULOSIS

## GROUP III

## SYMPTOMS DUE TO THE PROCESS PER SE

Spitting of blood.

Sputum.

Frequent and protracted colds (tuberculous bronchitis).

Pleurisy (tuberculosis of the pleura).

In the second volume is found on page 72 a short paragraph on the "Treatment of Pleural Pain," added to the chapter on "Tuberculous Pleuritis," as it appears in the first edition. A brief mention is made in a final paragraph, added to that chapter in the second volume which deals with "Food," of a subject which today engages in an absorbing manner the attention of all workers in the general subject of nutrition, and in considerable measure that of all intelligent persons—laymen as well as physicians. The caption of this paragraph suggests that before long, if it has not already been started, a very complete and thorough-going study will be made of the relationship existing between vitamines-

intake and tuberculosis in all its manifestations. The third edition of "Clinical Tuberculosis," will without doubt see this work covered in detail. A final chapter on "Influenza and Tuberculosis," which concludes the second volume will be of interest to those who remember the experiences of the recent pandemic that swept over practically the whole of the civilized world, and in particular to those medical men who served as temporary officers of the United States Army and who recall the large number of post-influenzal cases returned to the United States in 1917 and the early months of 1918, with the mistaken diagnosis of pulmonary tuberculosis, before clinicians and roentgenologists had come to a clear understanding of the changes to be found in the lungs and bronchi as sequelae of influenza, and of the differential diagnosis between such changes and tuberculous disease.

The first volume deals with "The Pathological Anatomy, Pathological Physiology, Diagnosis and Prognosis of Tuberculosis." Its twenty-two chapters are more specifically concerned with the following subjects: "Pathological Changes in Tuberculosis," "The Sources and Routes of Infection and the Primary Focus," "Relationship of the Primary Focus to Clinical Tuberculosis," "Tuberculosis in Childhood," "Factors Which Predispose to Tuberculosis," "Why the Apex is Involved, A Critical Study of Freund's Theory of the Ossification of the First Costo-sternal Articulation and Shortening of the First Costal Ring, as Predisposing Factors in Apical Tuberculosis," "The Nervous System in Tuberculosis," "The Nervous System (Continued): The Vegetative Nervous System in its Relationship to Diseases of the Lungs: A Discussion of Principles, Including the Antagonistic Action which is Manifested between the Parasympathetic and Sympathetic Division," "The Nervous System (Continued): The Relationship of the Sympathetic Nervous System to Toxemia and the Depressive Emotional States in General," "The Circulatory System in Tuberculosis," "The Digestive System in Tuberculosis," "Compensatory Changes in the Thoracic and Abdominal Cavities Resulting from Pulmonary Tuberculosis," "Traumatic Tuberculosis," "Important Anatomical and Physiological Facts to be Considered in Making Physical Examination of the Organs within the Thorax," "The Diagnosis of Early Pulmonary Tuberculosis: History and Clinical Symptoms," "The Diagnosis of Early Pulmonary Tuberculosis: Physical Examination of the Patient," "The Signs and Symptoms of Advanced Pulmonary Tuberculosis," "The Physical Examination of the Patient in Advanced Pulmonary Tuberculosis," "Tuberculin Tests in Diagnosis," "The X-Ray as an Aid to the Diagnosis of Pulmonary Tuberculosis," "Laboratory Methods," "The Diagnosis and Differential Diagnosis of Tuberculosis, particularly Pulmonary Tuberculosis," and "Prognosis." Volume II is given up to a consideration of "The Complications and Treatment of the Disease," the latter subject including a detailed recital of several valuably illustrative cases. It contains twenty-nine chapters, whose individual titles are as follows: "Tuberculous Laryngitis," "Tuberculous Enteritis," "Tuberculous Pleuritis," "Pneumothorax," "Tuberculous Meningitis," "Tuberculosis of the Genitourinary System," "Other Non-Pulmonary Tuberculous Complications, Tongue, Tonsil, Pharynx, Ear, Bones and Joints," "Fever in Tuberculosis," "Anaphylaxis," "Asthma," "Pulmonary Hemorrhage," "Principles Underlying the Therapeutics of Tuberculosis," "Relationship between Physician and Patient," "Open Air," "Climate," "Rest and Exercise," "Food," "Tuberculin," "Psychotherapy," "Hydrotherapy," "Heliotherapy," "Artificial Pneumothorax," "Treatment of Symptoms," "Useful Pharmacopoeial Remedies in the Treatment of Tuberculosis and its Symptoms," "Home Treatment," "Sanatorium Treatment," "Prophylaxis," "The Tuberculosis Clinic," and "Influenza and Tuberculosis." The book contains very numerous schematic

representations, roentgenographic illustrations, reproductions of photographs, and charts illustrating all phases of the subject treated.

This work is not a textbook, a manual, or a handbook of the subject. It is an encyclopedia, and as such it occupies a unique position as a work of reference on tuberculous infection of any and all parts of the body.

A. N. TASKER,

*Major, Medical Corps, U. S. Army.*

THE SURGICAL CLINICS OF NORTH AMERICA, issued serially, every other month (six numbers per volume). Octavo; illustrated. Volume II, Numbers II and III. W. B. Saunders Company, Philadelphia and London. Cloth, \$16.

The sixteen clinics presented in the April 1, San Francisco, number are instructive and of general excellence. Several are outstanding. The Clinic of Dr. Woolsey on Anthrax Pustule presents the subject in a different manner from that found in textbooks, and his recommendation for a treatment based upon personal experience and the report of the New York Health Department tends strongly to confirm his recommendation. The treatment consists of the employment of anti-anthrax serum, 2 to 3 cc. locally every twenty-four hours, and its intravenous use in large doses (85 to 200 cc.), repeated as the general condition indicates. The particular point of interest is that *no surgical treatment is justifiable*, as against the recommendation of our textbook writers and most articles which have heretofore appeared in print. The Clinic which will appeal most strongly to the general surgeon is that of Dr. Brunn on the Treatment of Cancer of the Recto-sigmoid Junction. The object of this technique is the preservation of the rectal sphincter. The technique employed must be commended as it is supported by ten operations, with two deaths, one from pulmonary embolism and the other not due to any fault of the anastomosis itself but to a kink above the anastomosis. Of added importance, no stricture occurred at the site of the anastomosis in any of the other eight cases, which went on to symptomatic recoveries; this formation of a stricture is too commonly the case where any of the other several types of anastomosis are employed. Three other clinics are specially to be noted, one by Dr. Naffziger on Spinal Cord Tumors, one on Leg Ulcer by Dr. Eloesser, and one by Dr. Lynch on Etiology and Treatment of Prolapse.

The June (Chicago) number is written by the well-known clinicians who so often contributed to the "Surgical Clinics of Chicago" and were responsible in a great measure for their success, and who are supporting this newer venture. The June Clinics are of the same excellence as others for which these surgeons are so well known. Among the writers may be mentioned Ochsner, Bevan, Halstead, Kanavel and Kellogg Speed.

JOHN E. SUMMERS, M.D.



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# THE MILITARY SURGEON

VOL. LI

OCTOBER, 1922

NUMBER 4

## USHER PARSONS (1788-1868), SURGEON, UNITED STATES NAVY<sup>1</sup>

BY CAPTAIN F. L. PLEADWELL

*Medical Corps, United States Navy*

USHER PARSONS was born in the town of Alfred, York County, Me., when Maine was still a district of the State of Massachusetts, so that both states may rightfully count him among their distinguished sons. The date of his birth was August 18, 1788. He was the youngest of the nine children of William and Abigail Frost (Blunt) Parsons. William Parsons was descended from Joseph Parsons, who came to this country from England in 1635, settling first at Springfield, later at Northampton, Mass. His oldest son, Joseph, became a prominent citizen and trader in Northampton and died there in 1729. Joseph's oldest son, also named Joseph, graduated at Harvard College in 1697, and was a pupil of the Rev. Increase Mather. He became a clergyman at Lebanon, Conn., afterwards at Salisbury, Mass., where he died in 1740. His oldest son, in whom was still perpetuated the name of Joseph, was a clergyman at Bradford, Mass., from 1726 to his death in 1765. This Joseph, who married Frances, daughter of John Usher, lieutenant governor of New Hampshire, was Usher Parsons's grandfather. Joseph and Frances Parsons had six sons, and of these, three graduated at Harvard and were, respectively, clergyman, physician, and lawyer. The remaining three children became mechanics and traders. It was noteworthy that of the two groups of children those who went to college survived only to an average age of 36 years, while those who remained at home and followed the trades reached an average age of 76 years. The fifth son, William, was Usher's father. He was born in Bradford, Mass., in 1743, and followed,

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<sup>1</sup>Reprinted from United States Naval Medical Bulletin, Volume 17, No. 3.

For much of the material appearing in this article the writer is indebted to the article on Usher Parsons in Kelly and Burrage's "American Medical Biographies" and to a "Memoir of Usher Parsons, M.D.," by his son, Charles W. Parsons.

by turns, the calling of trader, farmer, manufacturer of potash, lumber merchant; he was also a town officer.

William Parsons left Bradford and settled first in South Berwick, Me., then in Alfred, where he died in 1826. He married Abigail Frost Blunt, daughter of Rev. John Blunt, of Newcastle, N. H., whose wife was a daughter of Hon. John Frost. The mother of John Frost was a sister of the celebrated Sir William Pepperrell, who captured Louisburg in 1745.

The family connections mentioned in this review of Usher Parsons's ancestry will explain not only the origin of his Christian name but also his interest in writing in 1855 a life of Sir William Pepperrell, who possessed the distinction of being the only native of New England who was created a baronet during its connection with the mother country.<sup>2</sup>

Usher Parsons's boyhood was spent in Alfred, where he attended the village school in winter and worked on his father's farm in summer. He was 11 years of age when General Washington died and often recalled wearing crepe and taking part in a mourning procession of school children on the occasion of this sad event. When 12 years of age he was sent to school at the Berwick Academy but only remained there a year, a period far too limited for him to acquire more than the bare rudiments of a preliminary education. After leaving school he worked as a clerk in several retail stores in Portland and Wells (now Kennebunk), Me. His service in the latter town terminated on March 29, 1807. As an indication of its very satisfactory character the following certificate of his employer is quoted:

This may certify that I, the subscriber, of Wells, have employed Usher Parsons as a clerk to assist me in my store for upwards of eight months; and have found him to be a capable Lad possesst of steady habits, and well calculated for book-keeping. Wells, August 16th, 1806. Daniel Little.<sup>3</sup>

On May 6, 1807, when not quite 19 years of age, Usher Parsons began his life work by entering the office of Dr. Abiel Hall, of Alfred, as a student in medicine. His industry as a clerk had enabled him to accumulate a little money, and these savings were drawn upon now for board, lodging, books, and later for a course of anatomical lectures which he attended at Fryeburg, Me. These lectures were delivered by the well-known Dr. Alexander Ramsay.

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<sup>2</sup> Life of Sir William Pepperrell, Bart., Cambridge, Mass., 1855.

<sup>3</sup>Father of the late Charles C. Little, of the firm of Little, Brown & Co., Boston.

an eccentric but gifted Scotchman, who had come to this country from Edinburgh in 1802 to offer his services at the time of the yellow-fever epidemic in New York. Usher Parson's lifelong interest in anatomy had its origin in the teachings of Dr. Ramsay, who was himself an enthusiast in this branch of medical science. During his apprenticeship with Dr. Hall he studied anatomy; saw a little of the practice of medicine; read Dr. William Cullen's *First Lines of the Practice of Physic* (1776-1794); and studied the works of Erasmus Darwin<sup>4</sup> and the celebrated Dr. John Brown.<sup>5</sup> His medical studies were often interrupted by visits home, where he worked on his father's farm, and by periods of teaching school in Alfred and the neighboring towns, in order to add something to his slender funds. While still at Kennebunk, Parsons printed his first literary production in the shape of some verses entitled "A Petti-fogger's Soliloquy," which appeared in the *Freeman's Friend*, a newspaper published in Saco, Me.

Of the incidents of his daily life at this period, and of his efforts at self-improvement, both in general education and in medical work, and of the difficulties met with and overcome in prosecuting his studies, we may learn most satisfactorily from the following extract, which is taken from an account which he wrote himself in later years:

<sup>4</sup> Erasmus Darwin (1731-1802), whose *Loves of the Plants* (1789) and *Zoonomia* (1794) emphasized the gradual evolution of complex organisms from simple primordial forms, the struggle for existence in animals and plants, sexual selection, protective mimicry, and the indirect influence of environment in producing transformations which may modify species. (Garrison.)

<sup>5</sup> John Brown (1735-1788). "The disputatious and disreputable Brown," as Allbutt styles him, was a coarse man of low habits whom Cullen had taken up and launched but who, like Colombo, Borelli, and other ingrates of medicine, turned against his quiet teacher with the plebeian's usual tactics of reviling his intellectual betters in order to exalt himself. Yet the Brunonian theory, as it was called, actually held the attention of Europe for a quarter century, and as late as 1802, a rixa, or students' brawl, between Brunonians and non-Brunonians at the University of Gottingen lasted two whole days and had finally to be put down by a troop of Hanoverian horse. As far as it went, the theory was absolutely consistent and complete in all its parts. Brown regarded living tissues as "excitable," in lieu of the Hallerian "irritability," and life itself as nonexistent, except as a resultant of the action of external stimuli upon an organized body. Diseases are then "sthenic" or "asthenic," according as the vital condition of "excitement" is increased or diminished. The essentials of diagnosis are simply whether a disease is constitutional or local, sthenic or asthenic, and in what degree, and the treatment consists in either stimulating or depressing the given condition. To this end, opium and of course, alcohol were Brown's favorite agents. Hippocrates said that no knowledge of the brain can tell us how wine will act upon any particular individual, and Brown proceeded to apply this experimental idea *in propria persona* to elucidate his theory, using successive doses of five glasses at a time. Abuse of opium and alcohol eventually killed him. His method gained little support in France and England, but Rush took it up in America, Rasori, Moscati, Brera, and others in Italy, and in Germany, after Christoph Girtanner's plagiarisms of 1790 had been exposed and the "*Elementa medicinae*," translated by M. A. Weikard, Brown came into his own. The book hypnotized even Peter Frank and Roschlaub, and was greeted by a flood of pamphlets and salvos of praise. Although his errors were pointed out by Humboldt and Hufeland, Brown had the unique distinction of polarizing the German profession. His therapeutic ideas, Baas asserts, destroyed more people than the French Revolution and the Napoleonic wars combined; nor will we dispute the same historian's pronouncement that he was "morally deserving of the severest condemnation." (Garrison.)

Being disappointed of a remittance from my father of some money to enable me to attend a second course of lectures in Portland, by Doctor Ramsay, I walked about 15 miles in the night, nearly to Saco, slept a few hours on some hay in a barn, and I reached Kennebunk the following noon, and Alfred in the evening. During my moonlight walk, I meditated on the past and the future course of my life. I thought of the misspent time of my past years, of my low aims in the medical profession, until within the last few weeks, and asked if it would be possible, at this my 21st year, to begin a new course, that should redeem the time, and elevate me to a respectable rank in the medical profession. I was now wanting in preparatory education, unable to parse the most simple sentence in Latin, and hardly able to write a common letter in English grammatically. I had no means of educating myself but by school keeping. How many years am I willing, I asked, to devote to this and to hard study for the attainment of a rank in the profession that, with my present ambitious views, I shall be satisfied with? I concluded that 10 years would be required, and determined that all my energies should be employed for that length of time, and to be satisfied could I arrive at eminence in respect to knowledge, although the tenth year should find me as penniless as at this hour.

My resolution was now fixed and my plans matured this night, and in the main were not deviated from during that length of time. I determined to obtain the degree of A. M. and M. D., and to become a teacher of anatomy. On arriving at Alfred, I packed up my Latin books, and went to Sanford, 4 miles off, and placed myself in the family of Parson Sweat. I began with the Latin grammar, and by the last of November had gone over it several times and read two books in Virgil, and was able to read the Greek Testament a little. I then taught school two months in Elliot; then returned to Parson Sweat's a few months; then went in May to keep school three months half a mile from Berwick Academy; then attended the academy one quarter, and read two or three of the Evangelists (in Greek), and four orations against Catiline; then kept school at Alfred three months, and during evenings read Virgil nearly through, finished the Evangelists and the book of Romans. I now felt that to go through college in this tedious way would be likely to consume the ten years. I therefore concluded to return to medicine; to read a few months with Doctor Hall, at Alfred, and then study with some very eminent person six months, which would complete my three years, to attend a course of lectures, and then commence practice, or be ready to commence whenever a vacancy offered, and endeavor to go through the college studies whilst trying to get into practice. Accordingly I went to Doctor Kittredge, of Andover, but found him from home. I then went to Boston and entered the office of Doctor John Warren, for six months. It was with much difficulty that I got through with the expense of lectures and board, although assisted to \$50 by my father.



Following the plan mentioned above, Usher Parsons went to Boston in July, 1811, and succeeded in establishing himself under the preceptorship of the eminent surgeon, Dr. John Warren, brother of Dr. Joseph Warren, who fell at Bunker Hill. While in Boston he boarded at the Market Tavern in company with his brother-in-law, Gen. Samuel Leighton, then representative to the General Court from Elliot. In February, 1812, he underwent a successful examination before the censors of the Massachusetts Medical Society, and was duly licensed as a "practitioner of medicine."<sup>6</sup>

After passing his examination before the censors, he returned to his home in Alfred, but as war with Great Britain now seemed imminent,<sup>7</sup> and openings for beginning practice in civil life not encouraging, he made an attempt to get an appointment as surgeon's mate in either the Army or Navy. At first his efforts met with no success, but enlisting the support of his congressman, Dr. Josiah Bartlett, of New Hampshire, he was shortly commissioned as a surgeon's mate in the Navy. His commission bore the date of July 6, 1812.<sup>8</sup>

• (SEAL)

COMMONWEALTH OF MASSACHUSETTS.

We the subscribers, Censors of the Massachusetts Medical Society, duly appointed and authorized have examined Usher Parsons of Alfred in the County of York a candidate for the practice of Physick and Surgery; and having found him qualified do approve and license him as a Practitioner in Medicine, agreeably to the law in that case made and provided.

Dated at Boston this 7th day of February A. D., One Thousand Eight Hundred and twelve.

LEMUEL HAYWARD, MD.

THOMAS WELSH, MD.

ABRON DEXTER, MD.

JOSIAH BARTLETT, MD.

WILLIAM SPOONER, MD.

By virtue of the power vested in me, I have hereunto affixed the Seal of the Massachusetts Medical Society.

Attest:

JOHN WARREN, MD.

JOHN C. WARREN, *Recording Secretary.*

A true copy of the original.

Attest:

J. WHEELER,

*Dover, N. H., May 24, 1812.*

<sup>7</sup> War was declared on June 18, 1812.

<sup>8</sup> To the honorable PAUL HAMILTON, *Esquire,*

*Secretary of the Navy Department of the United States:*

The Undersigned a citizen of New Hampshire begs leave to give the name of Usher Parsons now of Dover in said State as a suitable candidate for an appointment in the medical part of the Navy. It is not now recollected that any citizen of New Hampshire is either a surgeon or surgeon's mate in the Navy and from the credentials, copy of which is enclosed, the subscriber believes that said Parsons would be useful in that department if a vacancy will admit his introduction.

I have the honor to be your humble servant,

JOSIAH BARTLETT.

N.B. His preceptors in medicine were Dr. Hall of Alfred, district of Maine and Dr. John Warren of Boston, Massachusetts, Professor of Anatomy and Surgery in the Harvard University, Camde.

The following copy of the credentials mentioned in Doctor Bartlett's letter has been found, and is believed to be worthy of reproduction here:

BOSTON, *January the 20th, 1812.*

This certifies that Doctor Usher Parsons has been three full years a student of Physick under Physicians of approved and established reputation during which he diligently applied himself to the various branches of his Profession; attending lectures in Anatomy and Surgery, the Theory and Practice of Medicine, Chemistry and Materia Medica and Midwifery—That his proficiency in these respectively has been such as deservedly to acquire the approbation of all the gentlemen under whom he has received his education, and that his moral character has been immaculate. I therefore recommend him accordingly.

JOHN WARREN.

A true copy of the original, attest:

J. WHEELER.

*Dover, N. H., May 24, 1812.*

His experiences at this time are best revealed by quoting again from the sketch of his early life:

After an unsuccessful attempt to get a school, to repair my wardrobe, I went to Exeter to get a place as physician, but was soon discouraged. I then went to Dover for a few months, but received no encouragement, and the expenses here added to my debts and poverty. There was now a prospect of war, and I tried hard for a place of surgeon's mate in the Army, but failed. At length an invitation was forwarded me by the surgeon of the *John Adams* to join him as mate, assuring me he would try to get my appointment of mate confirmed by a commission, but adding that I must be in Boston in 60 hours. I made all dispatch, but did not reach there till 64 hours, and then found the ship had sailed. I was now left with \$1, but I succeeded in borrowing another and returned. At Salem I tried for a berth on board a privateer. I reached Dover discouraged, indeed, and not a little mortified. A few weeks previous to this I had applied for a mate's commission in the Navy, but despaired of success, and I had now no hope left but that a chance might offer in a privateer. In about four days from my return from Boston I was told there was a package in the office for me. I went and found it to be a commission of surgeon's mate in the Navy, my pay to commence from that day. No one can imagine my joy; it was ecstatic, frantic.

In spite of his failure to catch the *John Adams* at Boston he was destined to go to this ship finally, for orders issued from the Navy Department under date of August 15, 1812, directed him to report

on board that vessel in New York. The period of Dr. Parson's service on the *John Adams* appears to have been very brief, for in September he as well as other officers and men of the ship volunteered for an expedition being fitted out under Commodore Isaac Chauncey for service on the Great Lakes. There was at the time very little exact information about the proposed expedition, nor is there now any written record of orders for Dr. Parsons to join it. On the contrary, there is evidence that he was directed to go to St. Marys, Ga., but these orders he never received, and he asserted an entire ignorance of them in correspondence with the department later. It was by a narrow margin, therefore, that fate decreed him to go where his services in battle a year later were to bring him the well-earned renown, which even now, more than a century later, makes him deserving of "perpetual rediscovery by the medical profession of the United States."<sup>9</sup>

The force of men composing the expedition which Parsons now joined left the Brooklyn Navy Yard for Albany on September 24, 1812, traveling first by boat to that point, and thence to Buffalo by wagons and on foot. It required only five days to reach Albany (from New York), but eighteen days passed before the expedition arrived at Buffalo.

During the succeeding winter and spring, 1812-13, Dr. Parsons was in charge of the sick and wounded at Black Rock, near Buffalo. At this time an epidemic of pleuropneumonia prevailed here and in other parts of the country. His observations on the treatment of this disease formed the basis of his first medical publication.<sup>10, 11</sup>

This small paper, written in the form of an open letter to a Dr. Ross, and published in a local newspaper, gives us an idea of Dr. Parson's professional acumen and reveals his controversial tendency, of which evidence will appear again somewhat later.

This article indicates a decided predilection for copious bleeding in the affection under discussion, and gives his experience with this treatment, which had been criticized by Dr. Ross. Dr. Parsons' contention about the seat of the disease (as being in the

<sup>9</sup> Am. Med. Biogs., 1920, p. 390.

<sup>10</sup> On Pleuropneumonia. Addressed to Dr. John Ross. *The Buffalo Gazette* (circa Jan. 19, 1813).

<sup>11</sup> This epidemic was the so-called "cold plague" of William Steward, D.D., author of the pamphlet "The Healing Art," 1812. A detailed account of the disease as it prevailed in the United States Army was written by Dr. James Mann, a hospital surgeon, in his "Medical Sketches of the Campaign of 1812, 1813, and 1814," Dedham, 1816. A very complete review of this epidemic, with bibliography, has recently appeared in the *Lancet* under the title "The Cold Plague of the War of 1812-14," by the Hon. William Renwick Riddell, LL.D. (*Lancet*, Mar. 11, 1922, p. 512).

thorax) and not in the "right hypochondrium," as claimed by Dr. Ross, is fully supported by a number of postmortem examinations of victims of the disease. In closing his letter, he states that he is "actuated principally by a desire to remove from the minds of my patients any undue prejudice against the use of the lancet, which the publication of your sentiment may occasion."

An attack on one of the enemy's batteries on the Canadian side of the Niagara River, which was made in November, 1812, resulted in casualties which gave Dr. Parsons a number of surgical cases, as did also the attack on Fort George on May 27, 1813. When, on May 28, the British blew up their magazines at Fort Erie, and retreated, Dr. Parsons with a Dr. Purcell and some twenty citizens crossed the river, took two prisoners, and marched to the fort. On arriving near the fort two men met them with a flag of truce and surrendered. The party then walked to the fort and were received most hospitably. Dr. Purcell was sent back with information of this occurrence, and in the evening the colonel in command crossed with a regiment and took possession. This incident was the basis for his story of receiving the surrender of Fort Erie, told by him on many occasions in later years.

Some two months previous to the events just related Capt. Oliver Hazard Perry had arrived at Erie (Presque Isle), Pa., from Newport, R. I. At this point the fleet was being built which was to meet the British force later in the year. It was in June that Captain Perry came to Black Rock for the purpose of taking back to Erie several small vessels intended to be fitted as men of war. Dr. Parsons appears to have been assigned to this force and accompanied Perry on June 14 when they sailed for Erie. Apparently many men were ill at this time with fever, the so-called lake fever, and Dr. Parsons was actively engaged in caring for them in a large unfinished courthouse, fitted as a hospital. This duty at Erie continued until some time in August. In this interval Dr. Parsons, with other officers, entered into the social life of the community and formed many pleasant acquaintances among the people of the town. On August 12, the little squadron under Perry sailed from Erie to the head of the Lakes. Dr. Parsons was assigned as the junior surgeon's mate on the flagship *Lawrence*. On the 19th the squadron was visited by Gen. William Henry Harrison and Col. Lewis Cass, and on the 26th it arrived at the mouth of the Detroit River, sailed thence to Sandusky, and then to Put-in-Bay, where the force anchored. Sickness was rife. Commodore Perry

and fully half the officers and many of the men were down with bilious remittent fever. Dr. Parsons himself did not escape, nor did his medical associates, Dr. Barton on the *Niagara*, or Dr. Horseley, his immediate senior on the *Lawrence*, but fortunately for Dr. Parsons, on the date of the battle, he was sufficiently recovered to be fit for duty, while the other surgeons were still too ill to be of service.

In speaking of his illness he states, "I did not escape an attack myself, which confined me two or three days, and during this time more than 100 lay sick without any medical aid." On September 3, he adds, "I never was so much emaciated." And now we come to the narrative of the Battle of Lake Erie:

In this weakened condition, with only one doctor in the squadron to attend the sick and take charge of the wounded of a battle, we met the enemy (September 10, 1813). The action was soon very severely felt on board the *Lawrence*, the two largest vessels of the enemy engaging her at short distance for nearly two hours. The *Lawrence* being shallow built, and affording no cock-pit, or place of security for the wounded, they were received on the ward-room floor, which was nearly level with the surface of the water. Being only ten or twelve feet square, this floor was soon covered, which made it necessary to pass them out into another apartment, as fast as the bleeding could be staunched. Several, however, were wounded a second time before this could be done. Midshipman Laub was moving from me with a tourniquet on his arm, when a cannon ball struck him in the breast; and a seaman brought down with both arms fractured was struck by a cannon ball in both legs. An hour and a half had so far swept the deck that new appeals for surgical aid were less frequent. This change was rendered the more desirable at this time, from the circumstance that the repeated request of the commodore to spare him another man had taken from me the last one stationed to assist in moving the wounded; in fact, many of the wounded themselves took the deck at this critical moment.

Having sole charge of the wounded of the whole fleet, and the wounded being passed down to me for aid faster than I could attend to them in a proper manner, I aimed only to save life during the action by tying arteries or applying tourniquets to prevent fatal hemorrhage, and sometimes applying splints as a temporary support to shattered limbs, etc. In this state the patients remained until the following morning, under the free use of cordials and anodynes. At sunrise (the 11th), I began amputations, and in the course of the whole day and evening was able to finish all operations and dress at least once or twice, and to do justice to them all. On the following day, I visited the other vessels and brought all the wounded on board the *Lawrence* and treated them in like manner.

In another account of the battle which Dr. Parsons wrote additional incidents are recorded:

PUT-IN-BAY, Friday, September 10.

At five o'clock a. m., discovered the enemy's squadron bearing North West, wind South West. At seven could see all the vessels, viz: two ships, two brigs, one schooner, and one sloop. At ten called all hands to quarters. At quarter before meridian the enemy commenced the action at one mile distance. In half an hour we came within musket shot of the enemy's new ship *Detroit*. At this time they opened a most destructive fire on the *Lawrence* from their whole squadron. At half past one, so entirely disabled we could work the brig no longer. At two p. m., most of the guns were dismounted, breechings gone, or carriages knocked to pieces. At half past two, when not another gun could be worked or fired from the *Lawrence*, Captain Perry hauled down the fighting flag, which bore this motto, *Don't give up the ship*, repaired on board the *Niagara*, and there raised it again. In ten minutes after we struck to the enemy Captain Perry made all sail with the *Niagara*, which hitherto had kept out of the action, and in fifteen minutes passed in among the British squadron, having the *Detroit*, *Queen Charlotte*, and *Lady Prevost* on the starboard side, and the *Hunter* on the larboard side, and silenced them all, and ten minutes before three they hauled down their colors. Two small vessels attempted to escape, but being overhauled struck a few minutes after three.

Killed on board the *Lawrence* (one lieutenant, eighteen midshipmen, and three others; sixty-three wounded).

Slept but little, and dressed about one-third, and secured with tourniquets such as bled copiously. During the action I cut off six legs in the cockpit, which were nearly divided by cannon balls.

Still further details of the action appear in the following extract from a letter to his father:

NEAR THE HEAD OF LAKE ERIE,  
ON BOARD THE U. S. SLOOP LAWRENCE,  
*September 22, 1813.*

Before the arrival of this an account of our victorious engagement with the British squadron on this lake will reach you. I can only add a few particulars. Most of the action was supported by this vessel, as you will suppose when informed that out of one hundred and fifty men (our ship's crew), thirty-one of whom were sick previous to the action, we had rising eighty killed and wounded, among whom were nearly all our officers save the intrepid Commodore. On board all the others were about thirty killed and wounded. This vessel was engaged with the enemy's two ships on one side and a brig astern raking us for two hours, all within musket-shot, during which we rendered the ships unmanageable, and when this vessel could not discharge another gun the Commander repaired on board the *Niagara*; and within fifteen minutes

after he arrived within close action with them, the enemy's three vessels struck.

Unfortunately for the wounded, the two surgeons had been confined for several days with fever, and could render them but little assistance. It has however operated in my favor, as I have had all the amputations to perform; and it affords me the greatest pleasure to reflect that in no case have I failed of the best success. This has inclined the Commodore's opinion so much in my favor that I have no doubt he will render me assistance towards obtaining a better situation. He is the first warm friend I have met with in the service capable of assisting me. I am now on my way in the *Lawrence* for Erie, having all the sick and wounded of the squadron on board, and shall continue in the hospital with them till they in a measure recover, and will then direct my course toward Cape Home.

General Harrison was on board the *Lawrence* this morning, and his army was on an island within half a mile of the vessel. It is supposed to consist of at least eight hundred regulars, militia and Indians. Tomorrow they cross to Malden, a distance of about eighteen miles. Since the capture of the British squadron, the Indians have evacuated Detroit, after burning the place, and (as is reported) massacring the inhabitants. The enemy's squadron mounted more guns than ours, and carried more men by at least one-fourth. I had some narrow escapes for my life during the action. Five cannon balls passed through the room in which I was attending to the wounded. Two of the men I had dressed and laid aside in the commencement of the action were killed, before it closed, by other shots.

I have had very poor health all the cruise, am reduced to a skeleton, but am recovering. Never will I cruise again on this lake or any other. The action was fought within about ten miles of Malden. The enemy came out over night for the purpose of attacking us, and in the morning were within about fourteen miles of us, the wind in their favor. We made sail to meet them, and the wind changed in our favor, which gave us an advantage over them. They had more killed and wounded than we.

It was a unique and almost unparalleled experience for a surgeon to have such a burden of casualties thrust upon him in so short a period of action, and the results speak well for Dr. Parsons' skill. Twenty-two officers and men were killed on the *Lawrence*, and several others with shattered limbs died shortly afterward. The wounded on the *Lawrence* numbered 61; in the whole squadron 96. Except for a consultation with two British surgeons on September 13, and assistance rendered by a surgeon sent him on the 14th from General Harrison's army, Dr. Parsons handled all the wounded himself. In referring to his work, Commodore Perry, in a letter to the Secretary of the Navy, stated:

Of Dr. Usher Parsons, surgeon's mate, I cannot say too much. In consequence of the disability of both the other surgeons, Drs. Horsely and Barton, the whole duty of operating, dressing and attending nearly an hundred wounded, and as many sick, devolved entirely on him; and it must be pleasing to you, sir, to reflect that, of the whole number wounded, only three died. I can only say that, in the event of my having another command, I should consider myself particularly fortunate in having him with me as a surgeon.

Dr. Parsons attributed his success in the treatment of the wounded to several factors. From the 12th to the 22d of September they were lodged in the open air on the upper deck of the *Lawrence*, sheltered by an awning. In addition they had a plentiful supply of cordials, fresh vegetables, and provisions, and finally they were buoyed up by the cheering influence of victory. On September 23 the *Lawrence* reached Erie, and the sick, wounded, and prisoners were landed and placed in the hospital there. For nine months Dr. Parsons continued in charge of this hospital at Erie, during which time he made many friends and formed many endearing associations there, which were a great source of pleasure to him in later years.

Congress voted medals commemorative of the Lake Erie victory to all participants, and Dr. Parsons received one of them in common with other officers. He also received a share of prize money, which was used to pay off the balance of debt incurred in obtaining his medical education. Not the least of the rewards which came to him as a result of his service on the Lakes were the surgical experience and Commodore Perry's friendship.

During the period from January 1 to February 5, 1814, he appears to have had service with the land forces at Erie, being assigned as surgeon of the Twelfth Regiment, Pennsylvania Militia, by orders from Maj. Gen. David Mead.

On April 15, 1814, Dr. Parsons received his promotion to surgeon, and on the 19th he sailed with the fleet from Erie for Detroit and Lake Huron. Troops were embarked at Detroit, and the combined land and sea forces then proceeded through Lakes St. Clair and Huron, and attacked Fort Mackinac. The attempt to reduce the fort was unsuccessful, and several officers and men were lost. The fleet returned, and Dr. Parsons was back at Erie on September 21.

The incidents of Dr. Parsons' career from this time on are best described by quoting directly from the "Memoir of Dr. Usher



Parsons" by his son. Except for a few minor changes in phraseology the text of this work has been followed strictly:

Perry had returned to the seaboard, and been appointed to command the new frigate *Java*, building at Baltimore, and was allowed to select his own officers. He chose several of his companions in lake service, among others, Dr. Parsons, who on the second of December, 1814, received orders to report to Perry at Baltimore. He was attached to the *Java*, under Perry, through the years 1815 and 1816. He appears to have now revisited his native village. It was at this period that he first came to Providence, traveling by stage with his comrade, Thomas Breese. They lodged at the house since known as the "Manufacturers Hotel." He passed the year 1815 mostly with the frigate, at Baltimore, Norfolk, New York, and other ports. War with England had ceased, and the frigate was ordered to the Mediterranean, to look after American interests, especially in connection with the Barbary States, and the threatening attitude of Algiers.

He sailed from Newport as surgeon of the *Java*, January 22, 1816, and reached the Straits of Gibraltar, February 12. On February 7, in a severe storm, several men were thrown from the masts and yards; some were killed, and others required surgical operations. In assisting to move them, Dr. Parsons was thrown between decks, breaking his right knee-pan. For this, he many years afterwards received a pension. His diary during this voyage of the *Java*, contained an account of his daily occupations, with full description of local customs and interesting places. He visited Gibraltar, Malaga, Port Mahon on the island of Minorca, Algiers, Tunis, and the ruins of Carthage, Tripoli, Messina, Palermo, and Naples. Perry gave his officers every proper facility for excursions on shore, which were often made by several of them in company.

On arriving at Algiers, April 1, they found the British fleet, under Lord Exmouth, which had gone there to secure the liberation of Christian slaves, and prevent future enslavement of captured citizens. The barbarous customs of piracy and the reduction of captives to servitude, and of demanding tribute from commercial nations, were beginning to call on that state the vengeance of the great Christian powers. In 1815, Decatur had secured by force of arms a treaty which relinquished claims to tribute from the United States, and released all American captives. Lord Exmouth now visited Algiers for a similar purpose. He obtained the release by a large ransom, of several hundred Christian slaves mostly belonging to nations of Southern Europe. Dr. Parsons writes, April 7: "The British fleet departed for Tunis with Christian prisoners. They paid from five hundred to one thousand dollars per head for them, except a very few belonging to the British, which were not ransomed."

Misunderstanding arose between the Dey and C

and a fight was expected. Dr. Parsons writes, April 8: "Volunteered my services to go in Captain Perry's boat, and prepared both for fighting or doctoring."

In May, he set out from Messina to visit Mount Etna. The excursion occupied four days. He was accompanied by Dr. Hoffman, of the United States Navy. His diary describes the villages and ancient ruins that they passed—the three regions, torrid, temperate and frigid—the exhausting ascent of the great cone, and the grand view from its summit, the sea, the flaming islands of Lipari, the varied landscape of Sicily, and the slopes of the mountain itself, its successive zones, its many villages, and its black rivers of solidified lava. From the village of Nicolist, which is half-way up the mountain, he was accompanied by a local magistrate, who had never before visited the crater; and who, reading in an old French Gazetteer that Lima was in South American inquired whether the United States were near that.

While at Naples, he examined repeatedly the remains of Pompeii and Herculaneum.

His journal of this voyage ends abruptly, at Naples, July 21, The *Java* revisited several ports on the Mediterranean, Tripoli, Algiers, Malaga and Gibraltar, and sailed in January, 1817, for the United States, bearing a new treaty with Algiers. The crew suffered with the small pox on the homeward voyage. On the occurrence of the first case, the men were mustered, and it was found that eighteen of them had never had either small pox or kine pox. They were vaccinated, but with matter brought from the United States a year previously, and the vaccination failed. Dr. Parsons thereupon inoculated them with small pox virus, and all had the disease mildly. Some continued sick when the *Java* arrived in Newport, and the town authorities gave permission to "land a number of persons from on board the said ship, with the small pox, at Coaster's Harbor island."

A more detailed report of the circumstances attending this epidemic was made by both Commodore Perry and Dr. Parsons, as will appear from the following letters:

U. S. SHIP *JAVA*,  
Newport, March 3, 1817.

SIR: The *Java* having arrived in the United States with several cases of the smallpox on board; it becomes a duty which I owe to myself to account to you for a circumstance, which may appear to shew a want of that attention in me, so essential on the part of a Commander toward the health of his crew.

The Invalids of the Squadron together with a number of men whose term of service had expired were sent on board the *Java* a few days before my departure from Port Mahon, and exchanged for an equal number of her crew. Shortly after sailing a case of the Small Pox was discovered, and an attempt was made to vac-

minate those who were in danger of taking the infection; but unfortunately the matter proved bad. It therefore became necessary to inoculate them for the Small Pox, and to my surprise, on inquiry it was found necessary to perform this operation upon eighteen of those who had lately been received on board. The same number, I regret to add, have since taken it in the natural way, four of whom have died. I had taken the precaution to have the *Java's* Crew vaccinated prior to my leaving the U. States.

Permit me Sir, to suggest for your consideration the propriety of making it the duty (by a special order) of the Commander and Surgeon of a public vessel and of Surgeons attending Rendezvous, immediately on a man's being shipped or received on board, who has not been vaccinated, to cause the same to be performed on him, and that the former be directed to report to the Department before sailing on a Cruise, their performance of this duty; and that the Surgeons be directed to keep constantly on hand a sufficient quantity of the vaccine matter.

For your further information Sir, I have the honor to enclose a report to me from the Surgeon, Dr. Parsons.

I am Sir, With great respect,

Your Obt. Servt.

O. H. PERRY.

The HONORABLE B. W. CROWINSHIELD,  
*Secretary of the Navy.*

U. S. FRIGATE *JAVA*,  
*March 3, 1817.*

SIR: Agreeable to your request I here state the particulars of the commencement and consequence of the smallpox in this ship.

The day following our departure from Gibraltar, and eleven days after our separation from the Squadron at Mahon, a seaman was attacked with this disease in its most malignant form. This man was among those whose term of service had expired and who were transferred to this ship to be discharged on their arrival in the U. States. On mustering the others, eighteen reported themselves to have never had either the small or kine pox. By your order they were immediately vaccinated, but with matter that I had brought from the U. States a year previous, and its age had rendered it inert. As soon as it was ascertained that the vaccination would fail, I inoculated them and by the use of medicine with strict attention to diet and regimen, they all underwent the small pox in its most benign form, none of them being confined more than two or three days.

Unfortunately for others, who failed to report themselves for inoculation eighteen men were attacked with the disease the natural way. Four of them died, and the recovery of many of the other was long dispaired of. I am, however, happy to inform you, that only six now remain on the list, all of whom are convalescing.

Altho' the distress and loss of lives occasioned by this disease are much to be lamented, it must be a pleasing reflection to you,

Sir, that you have prevented its spreading among our own crew by ordering their vaccination before we left the U. States. By a similar precaution on board the other ships in the Mediterranean, the serious calamity we have witnessed might have been prevented.

Besides those who died on our passage with the small pox, we have lost three with pulmonary consumption, making in all seven deaths; an unusual loss to be *seen* for one ship, but considering Sir, that in addition to our own sick, we had to take home all the incurable patients of the Squadron and hospital to the number of forty or fifty, and with a long winter passage, the number of deaths will seem as moderate as could have been expected.

I have the honor to be, Sir,

Your mos. ob'

(Signed) USHER PARSONS, *Surgeon*.

O. H. PERRY, Esq.

The *Java* arrived at Newport on March 3, 1817. On May 13, 1817, Dr. Parsons addressed a letter to the department which reads as follows:

BOSTON, May 13, 1817.

SIR: By the order of Commodore Bainbridge I hereby report myself to the Navy Department.

If consistent with the good of the service, I would wish for orders to remain attached to the *Java*, or if this indulgence cannot be granted, I would like to be continued on this station in some other situation. My object in this is to avail myself of the advantages which the town of Boston affords for professional improvement.

It will appear in the following narrative, which is taken from the "Memoir," that his wish to remain in Boston was gratified, and as a result he was enabled to complete his medical education and receive his degree:

In July Dr. Parsons came to Providence, bringing introductions from Commodore Perry and other naval friends, and contemplating a settlement there in civil practice. He resided there four months, boarding at the house of Major McClellan.<sup>12</sup>

In November he went to attend lectures at the medical school in Boston, and in March, 1818, he received the degree of doctor of medicine from Harvard University. His dissertation in graduating was on "The epidemic pneumonia of 1812-13, as it appeared about Lake Erie." In that year, he published, in the *New England*

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<sup>12</sup> Maj. Samuel McClellan, a native of Woodstock, Conn., and a pensioner of the Revolutionary War, died in Providence, February 7, 1850, aged 90 years. His house was for many years a resort of the most prominent lawyers, judges, and politicians of Rhode Island, and was a scene of much original and entertaining talk. It stood on Benefit Street, opposite the present rectory of St. John's Church.

*Journal of Medicine and Surgery*, a "Surgical account of the naval battle on Lake Erie," and a report of two cases of gunshot wounds of the thorax. He joined the Massachusetts Medical Society at that time. His mother died at Alfred on the 4th of July.

In July, 1818, he sailed from Boston as surgeon of the frigate *Guerrière*, Capt. Thomas Macdonough, for St. Petersburg, carrying out Mr. George W. Campbell, minister to Russia. He spent about ten days in St. Petersburg and wrote very full accounts of remarkable objects in that city and of peculiar customs. The frigate sailed thence to the Mediterranean. He was at Copenhagen October 14; off Cape Trafalgar November 4; reached Syracuse in December and spent several weeks at and near Messina. In April, 1819, the *Guerrière* left Messina for Palermo and afterwards sailed for Naples. Detailed knowledge of this cruise is best obtained from letters to his correspondents in the United States. These show that he took an active and inquiring interest in a great variety of subjects.

The following letter was addressed to Dr. Jacob Bigelow,<sup>13</sup> of Boston, then professor of materia medica in Harvard University:

PALERMO, May 8, 1819.

A few days since, I was favored with an introduction to the Professor of Botany and Materia Medica, and Director of the Royal Botanical Garden of Palermo. He took me through the college and botanical garden, and favored me with a particular description of everything pertaining to them. The college is a superb edifice, enclosed within the walls of the garden, and is furnished with books, prints, herbariums, etc. in abundance. In short, everything about this, as well as the garden, bears the impress of royal munificence. On entering the library, he handed me a book and asked me if I knew the author. It was the *Flora Bostoniensis* (written by Dr. Bigelow). He was much gratified with my reply, as well as with one of your papers on the comparative forwardness of the seasons, which I had taken care to have in my pocket. He observed that he had hitherto been obliged to depend on the botanical gardens of England for all his American plants, but was now

<sup>13</sup> Jacob Bigelow (1787-1879), of Massachusetts, was one of the greatest of American botanists, the three volumes of his *American Medical Botany* (1817-1820), illustrated with 60 plates and 6,000 colored engravings, technically devised by himself, being a work of international reputation, and, in America, approached only by the writings of Barton, Ratfinesque, Porcher, and Asa Gray. Bigelow was visiting physician to the Massachusetts General Hospital, professor of materia medica at Harvard and a great medical reformer. During the cholera epidemic of 1832 his wise sanitary rulings limited the mortality in Boston to 100, as against 3,000 in New York City. His discourse *On Self-limited Diseases* (1835) exerted a powerful influence upon medical practice in the United States, and, in the words of Dr. Holmes, did "more than any other work or essay in our own language to rescue the practice of medicine from the slavery to the drugging system which was a part of the inheritance of the profession." In 1855 Bigelow published an anonymous volume of clever poetical travesties entitled "*Eolopoesis*." (Garrison.)

desirous of obtaining them direct from America, and asked if I would name his wishes to you.

For the last six weeks our squadron has been in the harbor of Messina about one hundred miles from this. My opportunity for acquiring information of this sea has therefore been very limited. I have seen the other medical school of Sicily, at Catania, which is about as large and well conducted as the one at Palermo, there being about eighty students in each. We sail tomorrow for Naples, from which I shall visit Rome and Florence, and return home through France and England.

At Palermo he saw the telescope with which the first of the planetoids, Ceres, was discovered by Piazzi,<sup>14</sup> on the first day of the century. He remained at Naples a few weeks and writes from there a long letter to Mr. John Pickering,<sup>15</sup> of Salem, Mass., in regard to books he had bought for his correspondent. He says:

A word respecting Pompeii, which I have visited four times, with increasing interest each time. Excavations are still carried on, and of all the disclosures of the city, about one-eighth have been made since I saw it in 1816. Then there had been three large excavations, each something more than an acre in extent, ranging in a direction obliquely across the city, and distant from each other about ten or twelve rods. Since that year, streets leading from one excavation to the other have been cleared out, with the houses on each side of them, so that you can now walk through the ancient city and suburbs a distance of three-quarters of a mile, on the same pavements that the inhabitants did two thousand years since.

From Naples, the cruise was continued along the Barbary coast to Gibraltar, arriving there in the middle of June. He there received permission from Commodore Charles Stewart, dated United States ship *Franklin*, Gibraltar, July 15, 1819, to leave the *Guerrière*, on account of ill health, and "return to America, or make a trial of the air of the north of Europe." He thus writes:

My reasons for leaving the squadron are, that the Mediterranean climate disagrees with my health, on account of the heat and confined air of a berth-deck; and secondly, because I am very desirous of making the tour of Europe for the purpose of professional improvement, and do not expect to meet with another opportunity so favorable as the present; lastly, I am so exceedingly tired of the monotonous scenery of a man-o'-war, of the perpetual jarrings

<sup>14</sup> Giuseppe Piazzi (1746-1826), an Italian astronomer. He became professor of astronomy and mathematics at Palermo in 1781, director of the new observatory there in 1791, and director of the observatory at Naples in 1817. He discovered Ceres in January 1, 1801, and published star catalogues in 1803 and 1814.

<sup>15</sup> Pickering, John (1777-1846), an American philologist, son of Timothy Pickering. He published "Vocabulary of Americanisms" (1816), a Greek-English lexicon (1826), and "Remarks on the Indian Languages of North America," 1836.

that occur, and of the restrictions that are imposed on officers, that a change seemed desirable for the health of the mind as well as body.

He left Gibraltar on July 20 and went as passenger to Leghorn. He then visited Pisa in company with Captain Macdonough. He journeyed thence to Lucca and Florence. He examined the medical institution in the University of Pisa and took great delight in anatomical preparations in wax at Florence. He thence went by carriage to Rome and there passed some days, visiting the hospitals as well as the objects of general interest.<sup>16</sup> From Rome he embarked, September 6, in a small schooner for Leghorn, having only "the hard deck for a feather bed and without any covering; nor would any other have been of service, on account of the millions of fleas in the vessel." The voyage along the Tuscan shore was very uncomfortable. At a small unnamed port, "was called on to see an aged female afflicted with partial blindness, and another with fever. A jolly old bacchanalian is physician to about twenty soldiers who are stationed here, and to the few inhabitants. He professed great veneration for the Brunonian system of medicine, and his bloated face indicated the sincerity of his faith, though his apparel gave him the appearance of a Shakespeare's apothecary." He arrived in Leghorn September 10.

He then journeyed through Genoa, Nice, Aix, Avignon, and Lyons to Paris, arriving there September 29. He thus writes to Dr. Lyman Spalding:<sup>17</sup>

PARIS, *November 29.*

Having been pretty busily engaged for two or three months in attending hospitals and medical schools, I have thought it probable you might feel some curiosity to know how I have found them. These establishments are so numerous and employ so many lecturers and professors that a stranger at first sight would believe the attention of the whole city is directed toward them. I have attended the lectures of some whose names are familiar to you, particularly Dubois, Boyer, Dupuytren, Richerand, Alibert and Larry on surgery,—Vauquelin, Chaptal, Gay Lussac, Thenard and Abbé Haüy on chemistry. It is difficult to determine which surgeon to rank first, Dubois, Boyer or Dupuytren. The two first are older and consequently more experienced, but Dupuytren has been at the head of Hotel Dieu for several years, and during the time has performed more operations than all the other surgeons in Paris.

<sup>16</sup> Little of interest appears in his notes written at Rome, except the following: "The present season a steamboat, with appropriate machinery, was ploughing up the bed of the Tiber, but I did not learn that anything was found."

<sup>17</sup> Spalding, Lyman (1775-1821). Originator of the U. S. Pharmacopoeia.

I am willing to acknowledge him the best operator I have yet seen, although I think very highly of the other two and of Larrey. . . . Larrey is surgeon of the hospital of the king's guards, which is but a small establishment. An opinion prejudicial to him prevails, that he is too fond of cutting—that he has frequently amputated where it was not necessary. Medical gentlemen are permitted to see his patients every Thursday, when he gives a particular history of every case, and performs some operations. The last time I was there, I took the liberty of introducing myself to him, which he gave me no reason to regret doing; he inquired about hospitals in the United States. I have found the people here very ignorant of the state of medical science with us, and yet very desirous to be better informed. This circumstance has induced me to supply one of the journals with a short description of our contemplated Dispensatory. I have had the honor of becoming acquainted with Drs. Swediaur, Pinel and Cuvier. The two former are very advanced in life, and the latter is now turning politician.

In another place he writes:

Cuvier has exchanged natural history for politics; he has lately been erected a peer, and is a leading ultra royalist, as well as a noisy one. The liberals have enrolled his name in the list of political weathercocks, or among those who have turned at every change of government in France. Cuvier still holds a professorship, and continues his residence in the Garden of Plants, and gives a weekly levee in imitation of Sir Joseph Banks, to which all strangers are invited.

Sir Humphrey Davy passed through here not long since, on his way to Naples, to unroll the Herculean manuscripts. While here he examined the chemical laboratory, with other things connected with his scientific pursuits; but Englishmanlike, as the French say, he turned up his nose at everything. Every object they offered for his inspection he considered as unimportant, or said it was borrowed from England.

The following are extracts from his notebook, entitled, "Surgical notes and observations made in different cities in Europe, particularly in Paris and London," in which he gives short accounts of hospitals and medical schools in Palermo, Messina, Naples, Florence, Pisa, Genoa and Nice:

La Charite (Paris; October 13). Went through the wards with Boyer, his son-in-law, Roux, and about thirty students. Saw nothing but bad ulcers and those badly managed. The French surgeons are neither neat, scientific nor successful in their treatment of ulcers, wounds, etc. They rarely attempt to heal by the first intention; even in amputations below the knee, the first surgeons are in the habit of stuffing the stump with lint to prevent its closing by the approximation of the skin of the sides. This practice is



condemned in England and must ere long be in France. In regard to inhumanity and disregard of life, and the practice of poulticing inflamed limbs, he also severely criticises the hospital surgeons of Paris.

Larrey's manner of operating is pleasing. He uses the knife adroitly and gracefully, and is neat in his dressings. He is humane and solacing in his behavior to the patients, differing in this respect very much from Dupuytren, whose behavior to them is savage. This is the more remarkable when it is considered that D. has always been in civil life, while L. has always been in military practice where sympathy and fine sensibilities are less known. Their stature is much alike, both being very stout and very stately in their appearance. Larrey is very ready and pertinent in his remarks.

November 11. Went early to the hospital Salpêtrière to attend the physician in his rounds. Enquired for M. Pinel, who is physician-in-chief and at the head of the institution, and sent in to him my address, with a request that I might accompany him through the hospital. He invited me into his study, and after some enquiries about American hospitals, etc. we made a tour first through three large wards full of women past sixty years of age, and who were ill. After prescribing for these, we visited the lunatic apartments in which are women in every state of mental disorder, from slight melancholy to furious mania. Those of the latter description were many of them chained, and others shut up in prisons. . . . I found in this instance, that introducing myself to the professor had as good if not better effect than a letter would have had.

He bought many medical books and instruments in Paris. Among these was Laennec's treatise on auscultation, with a stethoscope of the original pattern, now a curiosity of medical history, and certified to have been "examined and used by Laennec."

Among other acquaintances formed in Paris was that of a genial and accomplished Englishman, Mr. William Clift, a pupil and connection of the great British physiologist and surgeon, John Hunter. This acquaintance, renewed in London, ripened into a lifelong friendship with Mr. Clift and his family, including his son-in-law, Prof. Richard Owen, the eminent comparative anatomist. These friends corresponded with Dr. Parsons for many years, and their kindness was continued to his relatives and to visitors whom he sometimes introduced to them by letter.

He went from Paris to London, arriving there December 4 and remaining till Christmas. In those three weeks he became acquainted with many of the most eminent surgeons and savants of London—Sir Astley Cooper, Abernethy, and others. He attended

the levee of Sir Joseph Banks. He breakfasted with Sir Astley Cooper but found him pressed with business. He gave considerable attention to the Hunterian Museum at the college of surgeons and contemplated the formation of a museum of anatomy founded on a principle suggested to him there, viz., that of bringing together specimens of corresponding organs and sets of organs from as many as possible of the different classes and orders of the animal kingdom. He attended two meetings of the Royal Society. Besides the usual sightseeing, he saw Kean play *Hamlet* at Drury Lane and heard a debate in the House of Lords, by Russell, Castlereagh, and others, on the subject of "rotten boroughs" and the expediency of admitting representation from large manufacturing towns in the House of Commons. The following extracts are from his diary in London:

December 9. Examined the Museum of the College of Surgeons. This collection is calculated for physiological purposes alone. Every organ of the animal machine is exhibited in as great a variety of animals as they have hitherto been able to collect. The separate organs are preserved in spirit and are arranged from those of the most simple to those of the most complex structure. The museum begins with the simple muscular fibre, rectilinear; then follow single and double penniform muscles, splinters, etc. Then the organs of digestion and assimilation, beginning with the stomachs of all sorts of animals; then the various organs of mastication, etc. etc.

20. Went to St. Bartholomew's and heard Mr. Abernethy lecture on organic diseases of the heart to about three hundred pupils, the most interesting lecture I almost ever heard. His manner is peculiar, and the most engaging and amusing as well as impressive I ever heard. Dr. Mason, of New York, makes somewhat such a figure in the pulpit as Mr. Abernethy does here. He is full of illustrative anecdotes which he tells with such a quaintness as to make one laugh. He is about fifty years old, of middle stature, head powdered, dressed in black.

He sailed from Liverpool December 28, in a merchant vessel, and reached Boston early in 1820. He was ordered in May to service at the Marine Barracks in Charlestown. While holding this appointment he resided much of the time at Cambridge, enjoying opportunities of study and mingling in the learned society of that place. It was at this time, and through the influence of acquaintances gained in Cambridge, that he realized his youthful dream of being appointed teacher of anatomy, which he appears never to have given up since the year 1809. In August, 1820, he was chosen

professor of anatomy and surgery in Dartmouth College. He wrote at the time: "Dr. Parsons's motive for engaging in lecturing is a desire to establish a museum of anatomy, human and comparative, on the plan of the late John Hunter's." He contributed a number of preparations, some of them in wax, which he had bought in his last visit to Europe. But he lectured there only one year.<sup>18</sup>

At this time he published at Cambridge the "Sailor's Physician," a medical guide for use on merchant vessels. This was extensively sold, changed its name to that of "Physician for Ships," and passed through five editions, undergoing various revisions and improvements. The four subsequent editions appeared in the years 1824, 1842, 1851, and 1867.<sup>19</sup>

In December, 1820, he left Boston to visit the medical schools of New York, Philadelphia, and Baltimore. He heard lectures from Drs. Hosack, Post, Francis, and Mott in New York, and Physick, Chapman, and others in Philadelphia. A fragment of diary still preserved shows his views of these eminent professors. He introduced himself to them as surgeon in the Navy. His observations show that he was intent on preparing himself for anatomical teaching. The following extract may be worth presenting:

December 31. Breakfasted with Dr. Hosack. Examined his anatomical museum, which is small. His study is an octagon with a dome of light, and is filled with a choice and very large collection of books. He has a very small private study for the reception of patients. In this he has a small library. On one of the shelves

<sup>18</sup> MARINE BARRACKS.

*Charleston, Mass., October 9th, 1820.*

SIR: In reply to the enquiry whether it be my determination to resign my commission as surgeon in the Navy, in consequence of having received an appointment as professor in a Dartmouth College, I have to observe; that said appointment has not yet been accepted, and that it is my purpose (the department being willing) to continue in duty in my present situation another year, or till one attempt more shall have been made in Congress to improve the Condition of Navy Surgeons.

I have the honor to be,

Very respect'y. Your obed't servant,

USHER PARSONS.

HON. SECRETARY OF THE NAVY.

<sup>19</sup> Two editions of this work have been found in the Naval Medical School Library, with titles as follows:

Parsons, Usher, M. D. Fellow of the Massachusetts and Rhode Island Medical Societies, and formerly Surgeon of the U. S. Navy.

The Sailor's Physician, containing Advice for Seamen and Other Persons at Sea, on the Treatment of Disease and on the Preservation of Health in Sickly Climates. Second Edition. Providence: Printed by Barnum Field & Co. 1824.

Parsons, Usher, M. D. Late Surgeon in the U. S. Navy, and President of the Rhode Island Medical Society; Honorary member of the Massachusetts, New Jersey, Philadelphia and South Carolina Medical Societies.

Physician for Ships, containing medical advice for seamen and Other Persons at Sea, on the Treatment of Diseases, and on the Preservation of Health in Sickly Climates, and also in California. Boston: Printed by Damrell & Moor, No. 16 Devonshire St., 1851.

is an elegant volume of Thomas's Practice, dedicated to Hosack, which I had heard he always took pleasure in showing; and to gratify his humor, I anticipated his putting it into my hands by taking it down and asking what work it was. I at once saw what I had often heard, that he took a heartfelt satisfaction in perching upon this book to crow.

In April, 1822, Dr. Parsons began his long residence in Providence. He was for a while partner in medical practice with Dr. Levi Wheaton. He married, September 23, Mary Jackson Holmes, daughter of Rev. Abiel Holmes, D.D., of Cambridge, Mass., author of "The Annals of America." She died June 14, 1825, leaving one son. In April, 1823, he resigned his commission in the Navy.

A plan of giving lectures in Brown University, which had failed in 1817, was resumed in 1822. A medical school then existed at this institution, and Dr. Parsons was appointed professor of anatomy and surgery.<sup>20</sup> Beside lecturing to the medical students, he gave a short annual course to the higher classes of undergraduates. In 1826 he published an introductory lecture on anatomy and physiology as branches of general education. The policy of President Wayland requiring the officers of instruction to be also officers of discipline and give their whole time to collegiate duties necessarily severed his connection with the university. His special interest in anatomy, awakened in his youth by the lectures of Dr. Ramsay, continued through his whole active life. In 1831 he published at Philadelphia a volume, mostly compiled, on the Art of Making Anatomical Preparations.

From the time of the death of his wife until the year 1831 he boarded at McClellan's. In 1832 he built a one-story office of three rooms on President, now Waterman Street. This he afterwards enlarged and occupied until his death. Until the marriage of his son in 1853 he had no home establishment, but took his meals at hotels or boarding houses and generally slept in his office. He liked the freedom of this way of living. During the last fifteen years of his life he had a home with his son.

He rose gradually to a very prominent rank in his profession.

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<sup>20</sup> His associates were Drs. Levi Wheaton, professor of theory and practice of physic and obstetrics; John De Wolf, professor of chemistry; Solomon Drowne, professor of materia medica and botany. Wheaton was a pioneer physician of Providence, born there in 1761. He served as a surgeon of a privateer in 1782, and being captured by the British was detained a prisoner in New York, where he was put in charge of the prison ship *Falmouth*. When the Brown University Medical School was organized in 1812, Doctor Wheaton became professor of medicine in that institution. He was a sound practical physician, a fine classical scholar, and a writer of ability. He died in Providence in the year 1851.

Besides his varied opportunities, which brought him to the beginning of civil practice with more than usual experience and resources, he had many qualities of body and mind that fitted him for medical life. He was robust, with uncommon powers of endurance, and a frame strengthened by labor in early life. He was industrious, persevering, ambitious, and social; faithful in attendance, and considerate in his charges. His early training in naval service and the predominance of the reflective powers fitted him rather for the office of consulting physician and for cases of exceptional difficulty than for the ordinary run of daily medical practice. He had not that easy tact, that quickness of thought and command of language and features which were conspicuous in some of his contemporaries. Yet in many families of refinement and education his acquirements were appreciated and his ready sympathies and sound judgment made him a trusted adviser and friend. As consulting physician and surgeon he was very widely known in Rhode Island and in neighboring parts of other states. For many years a large part of his practice was out of Providence. He was a fast driver; and, before the railroads were multiplied, his sulky was well known on the roads leading from Providence in all directions.

His naval experience had turned his attention particularly to surgery. In European hospitals he appears to have observed surgical cases almost exclusively. As an operator he was more marked for caution than dexterity and was particularly methodical in the preparation and arrangement of instruments and dressings. He used to point out a house in Smithfield where he first operated for strangulated hernia in 1823. Being little acquainted with the operation, he studied it up, perhaps, in Scarpa's treatise, which he had bought in Paris, while the messenger was conveying him to the house. In the *American Journal of Medical Sciences*, 1848, he published a summary of his large surgical operations. He reports fifteen cases of herniotomy, with eleven recoveries. He performed lithotomy only once and successfully on a patient in Apponaug, aged 74 years. He tied the common carotid artery for a supposed tumor in the brain, producing intense headache and total blindness; the symptoms were relieved, but returned and ended in death. He extirpated the eyeball, with the lachrymal gland and much of the other textures in the orbit, as was then the common practice, instead of the milder process of enucleation. He operated frequently for cataract. He was at one time much interested in the surgical treatment of deformities and performed tenotomy often.

He contrived and used with fair success an apparatus for securing a union in cases of cleft palate.

It was only in the latter part of his professional career that he enjoyed the advantages of etherization in surgery. He never became so fully at home with it as the later generation of surgeons. In the greater part of his operations the only anesthetics at his command were such as laudanum and brandy and words of encouragement and sympathy. While in active practice he gave a great deal of attention to private pupils in medicine, having often several at a time and more than fifty in all. He very commonly had private dissecting classes in the winter.

After becoming well established in practice, Dr. Parsons allowed himself more liberty in regard to absence from Providence than is usual with equally busy physicians. In the autumn of 1843 he visited Europe for the third time, contemplating a journey to Egypt but going no farther than Paris, where his son was studying medicine. He spent some days in London on his outward journey, renewing his acquaintance with Mr. Cliff and attending a meeting of the Geological Society, where he saw Dr. Buckland, whose *Bridgewater Treatise* he had read with great interest. In Paris he frequented the hospitals and took copious notes of surgical cases, as he had done twenty-four years earlier. A few extracts from his diary show the character of his observations:

There is to my mind an unaccountable aversion on the part of French surgeons to attempt uniting wounds after operations, by the first intention. Today, the flaps made in the amputation might have been brought together, a depending opening left, and the whole or nearly all the wound closed; instead of which the old system in vogue twenty-three years ago is continued, of stuffing the wound with charpie or lint.

There is in French surgeons an indifference to life that seems inhuman. They operate when they should not; when they must know that the advantages to be gained are not to be compared with the risk of life, and the certain amount of severe pain that must be suffered from the operation.

He bought several valuable instruments and anatomical preparations in Paris. He also bought a copy of *Josephus*, printed by Schussler at Augsburg, 1470;<sup>21</sup> and the *Annals of the World's History*, printed by Walch at Venice, 1479, and adorned with woodcuts

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<sup>21</sup> Beloe, William: *Anecdotes of Literature and Scarce Books*, 1810, Vol. iv, p. 109. "This is a very rare and very curious book. . . in Gothic characters . . . the first printed by Schussler. (F. L. P.)

representing the Tower of Babel, Nineveh, Solomon's Temple, etc. He was in Paris from November 19, 1843, till February 19, 1844, when he set out for London. He there received polite attentions from Mr. Richard Owen, Bransby Cooper, Mr. South, Dr. John Forbes, and other distinguished surgeons and men of science; visited the largest hospitals, and attended a meeting of the Royal Society. He left London March 8 for Liverpool, Glasgow, and Edinburgh. Returning to Liverpool he there passed several days in the agreeable society of some old American friends and sailed April 4, bearing dispatches from the minister, Mr. Everett. He arrived in Providence April 22, 1844.

Dr. Parsons joined the Rhode Island Medical Society in 1823. In 1837 he was elected president of the society for three years, without having passed through the usual stages of vice-presidency. He was a constant attendant at its meetings and contributed several papers to its transactions. These were mostly on strictly medical subjects. One had a semihistorical character. In 1859 a committee was appointed to prepare sketches of eminent deceased physicians of Rhode Island, and Dr. Parsons, as its chairman, compiled from various sources a pamphlet on this subject. It contains notices of nearly forty physicians who lived on the island of Rhode Island, mostly in Newport; of the Brownes and others in Providence, and the north part of the state; and longer articles, contributed by other writers to the chairman, on Doctors Levi Wheaton, Solomon Drowne, Peter and William Turner, Charles Eldredge, Edmund T. Waring, and David King, all deceased.

His latest printed communication to this society was a "Letter on some points of military surgery," read December 19, 1860; and reciting some of his experience on the Great Lakes. This paper would appear to have been suggested by anticipation of the Civil War.

When the American Medical Association was organized in Philadelphia in 1847, Dr. Parsons was present as delegate and took an active part. In writing of the receptions then held, he says: "It was gratifying to me to find whenever I introduced myself to any stranger—which I did a dozen times this evening—as Dr. Parsons of Rhode Island, they all called me at once by my Christian name, having read of my writings through journals." For many years he attended the annual meetings of this association, successively in Baltimore, Boston, Cincinnati, Charleston, Richmond, New York, St. Louis, and Philadelphia. In 1848 he was appointed chairman

of a committee on adulterated drugs; and, in 1849, chairman of the committee on medical sciences. His report on this last subject contains a summary of the "progress of American medicine during the year." In 1853, at New York, he was elected first vice-president. In 1854, at St. Louis, he acted in the place of president at the early part of the meeting and as such delivered the opening address, the president, Dr. Jonathan Knight, of New Haven, being unable to attend.

He was honorary member of the medical societies of Massachusetts, Connecticut, New Jersey, and South Carolina.

Dr. Parsons was an industrious writer on professional subjects. He wrote frequently for the premiums instituted by Ward N. Boylston, Esq., of Massachusetts, and awarded by a committee appointed by the corporation of Harvard University for dissertations on "medical, anatomical, physiological, and chemical subjects." Four of these prizes were awarded to him, viz., for dissertations on periostitis, 1827; on enuresis irritata, 1828; on "The connection between cutaneous diseases which are not contagious and the internal organs," 1830; and on cancer of the breast, 1835.

The other subject proposed for the year 1830 was the comparative influence of animal and vegetable decomposition in producing fever. The premium for the best dissertation on this subject was awarded to Dr. Charles Caldwell, of Kentucky; but Dr. Parsons' essay on the subject was highly praised by the committee, with a wish that it might be published and its author's name made known. He also received the Fiske Fund premium in Rhode Island in 1842 for an essay on spinal diseases. These six papers were published in a volume. He contributed numerous articles to different medical journals.

In 1831 he was appointed professor of obstetrics in Jefferson Medical College, Philadelphia, and lectured there the following winter. Some valuable models for illustrating these lectures were lost at sea, on their way to Philadelphia. The subject was one for which his experience had not particularly qualified him. He did not afterward accept any appointment which would require him to reside away from Providence.

Dr. Parsons had long been impressed with the need of a general hospital in Providence, and he played a prominent part in securing a state charter for this institution and in obtaining bequests for its support.

When the Rhode Island Hospital was organized he gave \$1,000



to it. He followed the progress of the undertaking with great interest, though he had then withdrawn from medical practice. He gave about 300 volumes to its library and bequeathed it \$100 by will. He was at first appointed at the head of its consulting staff.

Dr. Parsons had too active a mind to rest satisfied with the knowledge required for everyday medical practice. He investigated many subjects more or less connected with his professional studies. When the doctrine called phrenology was presented in Boston, graced by the zeal and eloquence of Spurzheim, Dr. Parsons gave much attention to it. Dr. Jonathan Barber gave a course of phrenological lectures in Providence, and Dr. Parsons followed him in a short course, illustrated by many crania and models, describing the anatomy of the brain and concurring in the general principles of phrenology, but opposing the extravagant claims of the so-called science.

In 1837 he obtained a charter for the Rhode Island Natural History Society, of which he was chosen the first president. It held several meetings and made some collections but never attained the position of a working scientific society. He kept up the practice of collecting specimens. He purchased and read the geological works of Buckland, Hitchcock, and others. He had some knowledge of field botany, and occasionally gave private courses of botanical lectures to classes of young ladies.

In 1831 he prepared an address on temperance, which he delivered in Providence and other places, and which was afterwards published. In 1840 he lectured before the American Institute of Instruction, at its meeting in Providence, on the connection and reciprocal influence of the brain and stomach. In this as in other addresses partaking of a physiological character, he dwelt much on the doctrines of Bichat, whose treatise, "*Sur la Vie et la Mort*," had made a great impression on his mind, and was habitually recommended by him to his medical pupils.

His reading on subjects not connected with physical science was mostly in works of history and travel. He took little interest in purely imaginative literature. He read few of the classical novels. A special interest in the remains of Pompeii, which he had carefully examined when cruising on the Mediterranean, led him to buy and read Bulwer's "*Last Days of Pompeii*." In poetry, his favorites were Thomson and Young. He often read through the "*Seasons*" as the seasons came around and was equally familiar with the "*Night Thoughts*." He selected the opening lines of this poem for

his son to speak at a school declamation when less than ten years old, and it will be readily believed that they were not very intelligently or impressively uttered. He was also a regular reader of the Bible. Besides frequent recurrence to certain favorite parts, especially in the Psalms, he read through the Bible, with probably some omissions, four times in the last thirty years of his life. He thus wrote in his notebook November, 1837:

I have this day finished the Old Testament, which I began in June, 1837. I cannot but think that the Christian religion would gain by excluding some of the books. Two-thirds of what follows the first chapter of Jeremiah might be omitted, and all of Solomon's Song. These writings of the Prophets might be transferred to the Apocrypha, or incorporated into a separate division of the Bible, and considered as elgies on the woes prepared by Divine Power to bring upon this ill-fated people the Jews. The Bible, after such an exclusion, would be read more generally, intelligibly and thoroughly, than it is while encumbered with such a mass of matter so irrelevant to subsequent ages of the world. As a rule of life, and a history of God's government and the plan of salvation, an abridged volume might be formed for general circulation, which would embrace all that is essential. I shall now commence reading Tyndall's New Testament with notes.

His ecclesiastical relations were peculiar. He was brought up in congregational worship and the faith of the Puritans.<sup>22</sup> Soon after his marriage he was admitted to the Episcopal communion at St. John's Church. In later years he had a seat in one place of worship after another—St. John's the First Baptist, St. Stephen's (now Church of the Saviour), and the Central Congregational Church. For the last twelve years of his life the latter was his usual place of attendance on Sundays and the only one where he owned a pew, though he frequently partook of the communion of the Episcopal Church. He often went to other churches, especially the Unitarian, under the ministry of Dr. Edward B. Hall, whose preaching he much admired. After hearing him on Thanksgiving Day, 1853, he wrote in his notebook: "I wish he and other Unitarians would follow after St. Paul's example and preach a little more about Christ and Him crucified. At the same time, I wish orthodox would preach more practical sermons and not be forever harping on particular doctrines of the Calvinistic order."

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<sup>22</sup> His grandfather, the minister of Bradford, was suspected of Arminianism. Whether any traditional influence inherited from him softened the rigor of Calvinistic belief in the family of his son William is not known.

In his busiest years of practice he was remarkably regular in attending church once or twice on Sunday.

He seldom took an active part in politics. He voted with the Whig Party in its day. The nomination of General Harrison for President awakened a special interest in him on account of the general's connection with Commodore Perry and the service on Lake Erie. Dr. Parsons wrote several newspaper articles in favor of Harrison which were widely reprinted and spoke on the same subject in the old town house October 19, 1840. He was appointed messenger to carry the electoral vote of Rhode Island to Washington and handed the package of votes to Vice-President Richard M. Johnson. When the suffrage troubles arose in Rhode Island he did not share in the attachment felt by many natives of this state to the charter of 1663, and his sympathies were with the movement for enlarged suffrage. Mr. Thomas W. Dorr<sup>23</sup> was his intimate friend. But when the affair took on a revolutionary character he rallied to the support of the existing government. He acted as volunteer surgeon of the marine artillery. The subsequent imprisonment of Mr. Dorr was exceedingly distasteful to him. He exerted himself to procure his release by circulating petitions, etc., but his course did not suit the uncompromising views of Mr. Dorr, and was unavailing. Immediately after the passage of the act of liberation he visited Mr. Dorr as physician and friend.

On the outbreak of Civil War, in 1861, he offered his services as surgeon, in a letter to Governor Sprague. He was commissioned, in June, 1861, surgeon of the Providence Horse Guards. He followed the various fortunes of the conflict with intense interest. At the time of the presidential election in 1868, his last illness had begun; he had been confined to the house sixteen days, and walked with difficulty. The warden came down from the wardroom, and met him in the lower entry, where a chair had been arranged, and he gave his last vote for Grant and Colfax.

From an early age he was interested in tracing the history and genealogy of his family. Till the year 1834 he did not correctly follow up the line beyond his great-grandfather, Rev. Joseph Parsons, of Salisbury. In that year, he carried on a lively correspondence with the eminent antiquary of Northampton, Sylvester Judd, Esq. Mr. Judd's valuable letters helped him to connect Joseph Parsons, of Salisbury, with the first Joseph, of Springfield, and the second

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<sup>23</sup>The leader of the so-called Dorr's rebellion in the year 1842.

Joseph, of Northampton. He explored old graveyards, old records, and all written sources of genealogical lore. He visited the towns where his ancestors had lived, talked with the old men of those places, and treasured up the knowledge he had learned from their trembling lips. A manuscript book is still preserved, in which he wrote out the history of the families of Parsons, Frost, Usher, etc., with sketches of the lives of individuals, and preserved autographs of many. In 1838, he printed on a sheet an outline of the "Genealogy of the family of Joseph Parsons."

In 1849 he prepared a somewhat elaborate memoir of Maj. Charles Frost, his great-great-grandfather, who was a man of some importance in civil and military affairs and was killed by the Indians in Kittery, now Elliot, July 4, 1697. This was published in the *New England Historical and Genealogical Register*, July, 1849. It was founded on materials drawn from old manuscripts obtained in Maine, especially the voluminous papers left by Frost's son-in-law, Capt. John Hill, who commanded Fort Mary, at Saco, from 1693 to 1700. It contains, from the original in his possession, the account of Major Frost's death, written to Captain Hill by Joseph Storer, who was another son-in-law of Major Frost. Dr. Parsons afterwards prepared a genealogy of the Frost family and an account of "the descendants of Peter Hill, of York County, Maine, with some incidents relating to the French and Indian wars," founded on the same Hill papers.

His most important literary undertaking, the "Life of Sir William Pepperrell," sprang originally out of his genealogical studies. He began to prepare for this task in the year 1846 but suspended it on learning that Pepperrell's life would be written by others. The principal exploit of Pepperrell, in heading the attack on the French fortified town of Louisburg, in 1745, and reducing it after a siege of forty-eight days, had been fully described by Belknap and other historians. But no extended memoir of Pepperrell had been published. Rev. Dr. Charles Burroughs, of Portsmouth, N. H., and Hon. Lorenzo Sabine, of Framingham, Mass., had both prepared sketches of his life. A connection of the family, Col. George Sparhawk, of Kittery, where Pepperrell's mansion still stood, had talked of writing his biography and was known to have a great many of his papers, which had lain neglected in a shed or fish house on the estate, till Colonel Sparhawk selected and arranged the more valuable documents. It was after correspondence with

these gentlemen and many others that Dr. Parsons determined to carry out the undertaking. He read the state and local histories bearing on his subject, examined the papers in the Massachusetts Historical Society and other public places of deposit, and procured documents from all available sources. The Sparhawk papers, after some negotiation, reached his hands in January, 1851, through the kind offices of Mr. John Blunt, of New York. For four years after that he gave much of his leisure to this work.

Not satisfied with studying the details of Pepperrell's career in its written and printed records, Dr. Parsons visited the harbor and ruins of Louisburg in August, 1852, in company with his nephew, Edwin Parsons, Esq., of New York. They took the English steamer from Boston to Halifax, and then a small steamboat to Sidney, driving thence to Louisburg. An account of his observations there is given in the "Life of Pepperrell."

At the beginning of the year 1855, his book was essentially completed, and had been submitted to the friendly criticism of several historical scholars, especially Hon. Mr. Sabine, before mentioned, and J. Wingate Thornton, Esq., of Boston. It was published in May. It was very favorably received by students of colonial history, both in America and England, and was kindly noticed and somewhat copiously analyzed in the leading newspapers and magazines of this country, and in the London *Athenaeum*. The subject, being ante-revolutionary, was interesting both in the mother country, where several descendants of Pepperrell still lived, and in America. It was republished in London in 1856.

Most of the reviews of this book consist mainly of an analysis of its contents, and are hardly fitted for mention here. The following few sentences from a discourse delivered before the Rhode Island Historical Society, by its president, Hon. Samuel G. Arnold, the author of the History of Rhode Island, give one a very good idea of contemporary opinion on this work:

This work is a very important contribution to our colonial history. The conqueror of Louisburg was one of the foremost men that America has produced. A merchant of vast wealth, whose landed possessions alone extended thirty miles from the Piscataqua to Saco, acquired by his own skill and industry; a soldier whose genius was attested by success in capturing the stronghold of France from its powerful defenders; a civilian whose talents were everywhere admitted to be of the highest order. Sir William Pepperrell was the only native of New England who was created a baronet during our colonial period. The *éclat* of the war of In-

dependence has dimmed the fame of the great names of ante-revolutionary days, and whoever aids to rescue from oblivion the achievements and the characters of the mighty men of the past, confers a favor upon humanity, and adds an enduring page to the volume of history. This Dr. Parsons has done in the memoir of his illustrious ancestor. . . . To revive the memory of these school-days of the republic, and to bring before us the men who led in that era of our national pupilage, and who formed the mind and trained the muscle of the growing state, is a pious duty which Dr. Parsons has well performed.

He left in manuscript a history of his native town of Alfred. When a celebration of the hundredth anniversary of the settlement of that town was contemplated, in 1860, he was asked to prepare a historical discourse, but declined on account of impaired health.

For many years he interested himself in studying the remains, language, and customs of the aborigines of this part of our country. The first record of his meeting with Indians is in the diary of his march from Albany to Buffalo, in 1812. He there writes, October 7, being on the route between Vernon and Whitestown:

Passed by the Oneida tribe of Indians, consisting of about two thousand souls. The warriors have volunteered their services to assist in prosecuting the war against Canada. Their dress is a shirt which does not extend the length of the trunk, a cloth pinned around the waist, and extending over perhaps a fourth part of the lower extremities, a pair of broadcloth leggings, moccasins, and a blanket thrown over the body. Their huts are one room, in which are one bench, kettle, pail, dish and samp-mortar. The tribe have two schools attended by all the children, and a church. The conversation of the warriors I could understand, but not of the squaws. This difference may be imputed to the circumstance that the warriors have more intercourse with the white people.

In his rides extending many miles around Providence, he examined the Indian burying grounds, and gradually made a collection of bones, and various utensils, such as hatchets, arrowheads, pots of soapstone, etc. He recorded the Indian names of localities, with the meanings that had been assigned them by tradition or by guess. In 1840, he furnished a barrelful of skulls, from an aboriginal burying place in Washington County, to Dr. Samuel G. Morton, of Philadelphia, author of *Crania Americana*.

After his principal historical work was published, and when he was about 70 years old, he began to collate and arrange his notes on Indian localities in Rhode Island. He made new researches on this subject, and by examination of various maps, of historical

works relating to Rhode Island, and old records, collected many new names, with supposed explanations of some. At length, in 1861 he published a pamphlet of 32 pages, entitled "Indian Names of Places in Rhode Island." It contains more than 300 titles, but some of the names are repeated in different applications; thus the name Pettaquamscot recurs as given to a river, a tract of land, and a rock. There are a few repetitions from inadvertence, sometimes concealed by an unimportant variation in spelling. In a preface he says:

No attempt is herein made, by the author, to examine Indian names of places as a philologist, or grammarian, but merely to gather such as were in existence when civilization commenced within the State of Rhode Island, according to its present boundary; and, in a few instances, give the meaning or derivation of the word used. I was led to this enterprise, partly for the amusement it might afford in my leisure hours, but more for the purpose of rescuing from oblivion names of places in use among the aborigines, and for the convenience of those who may hereafter wish to apply them to their country villas, factories, or institutions, as has often been done in this and other states.

As early as the year 1841 he visited the Indian burying ground and old fort in Charlestown, R. I., and made some examination of Indian graves. He went there several times in subsequent years, procured various Indian relics, wrote out descriptions of the places, and took part in some attempts at disinterment. In 1860, and again in 1861, he made these entries in his diary:

Saw the old Indian burying-ground and fort, and the articles lately dug up from Indian graves, as coins, wampum-peag, kitchen utensils, chains, iron and silver. . . .

Six of us went to the place and worked with spade till near midnight. Took up a well preserved skeleton, eight feet deep.

When some Indian graves were afterwards opened by another party, Dr. Parsons bought many of the bones and articles found with them and retained some in his possession at his death. He prepared a paper on this subject, which he read, exhibiting many of the relics, before the historical societies of Rhode Island and New York. This paper was published in the *Historical Magazine*, February, 1863. It describes the customs of the Indians in regard to burial, sketches the history of the Narragansett Tribes, and their intercourse with the Dutch, and particularly of Sachem Ninigret and his descendants, and gives a minute account of the discoveries made in the ancient Indian burying-ground, believed to have been

the sachem's cemetery. He states the reasons for supposing that the grave in which the most curious articles were found was that of Sachem Ninigret's daughter; and that the adjoining grave was that of the sachem himself, who was living when the country he inhabited was first settled by the English.

Dr. Parsons' various labors were recognized by his election to many literary and historical societies. He was a corresponding member of the historical societies of Maine, Massachusetts, New York, New Jersey, Georgia, and Wisconsin, the American Antiquarian Society, The Academy of Natural Sciences, etc. He was an active member of the New England Historical Genealogical Society and was its vice-president for Rhode Island from September, 1864, till his death. He joined the Rhode Island Historical Society in 1825 and was a useful member of it, making many contributions to its collections and reading several papers at its meetings.

It is well known that a controversy arose between Commodores Oliver H. Perry and Jesse D. Elliott in relation to the conduct of the latter in the naval battle of September 10, 1813, and that long after Perry's early death the credit of victory was claimed for Elliott by himself and his friends. Dr. Parsons took a warm and active interest in this dispute. He was strongly attached to Perry and convinced that Elliott's conduct was disgraceful. In conversation, by newspaper articles, by contributions to writings published by others, and lastly in a public historical address, he vindicated the claims of Perry and the truth of history as he understood it, often in terms reflecting severely on Elliott and his defenders.

In January, 1836, Tristram Burges read a discourse before the Rhode Island Historical Society in which he gave a vigorous account of the battle. In 1839 this was published with copious notes and diagrams of the battle in different positions. Some of these notes were furnished by Dr. Parsons. The "extract from the log book of the *Lawrence*" was taken from his diary. He contributed many notes to the "Life of Commodore Perry," published in 1840 by Alexander Slidell Mackenzie.

In 1852, having been invited to deliver the stated annual discourse before the Rhode Island Historical Society, he chose for his subject "The history of the battle of Lake Erie." "I have made this choice," he says, "first, because this battle is a part of Rhode Island history, and therefore appropriate to the occasion; secondly, because I could speak of it from personal knowledge; and thirdly, because a very inaccurate and perverted account of it has been



written and imposed upon the public by the late J. Fenimore Cooper, esquire." He narrates the circumstances which led to the formation of a fleet on Lake Erie, the difficulties under which it was created and got afloat, and the reasons why it is regarded as belonging to Rhode Island history. He relates the incidents of the battle quite fully and then attacks Elliott and Cooper in a style of indignant sarcasm. In the words of Mr. Arnold, "He has done this in a style that leaves nothing to be said upon the points in dispute. His own testimony is direct and incontrovertible. His reply to the assaults of Cooper is comprehensive and complete. A certain irony pervades this portion of the address, which is the appropriate weapon wherewith to treat mendacity of statement when brought to the support of cowardice of conduct and infamy of character." Dr. Parsons had always a fondness for written controversy and could handle the caustic pen as well as the scalpel or saw.

In his more advanced life he became well known in the growing cities along the southern shore of Lake Erie. He often visited that region after his retirement from active practice. Those cities appreciated more and more the importance of Perry's victory, and commemorated its anniversary by yearly gatherings, and occasionally by special observations and various plans for the erection of monuments. Dr. Parsons was the only surviving officer of the battle who had cultivated historical tastes and possessed the powers of writing and oratory.

In 1858, the anniversary was celebrated at Put in Bay Island, near Sandusky, where Perry's fleet had anchored the night before the battle. There was a very large assemblage, and a brilliant display of yachts and steamers. Hon. Salmon P. Chase presided at the ceremonies on the island. Eloquent addresses were made, and three surviving officers appeared on the platform, Captains Champ-  
lin and Brownell speaking briefly, while Dr. Parsons read an elaborate narrative discourse. This was received with a great deal of interest by the large audience, and was afterwards printed in all the principal newspapers of Buffalo, Erie, Sandusky, Cleveland, etc. He afterwards wrote in his notebook, "this anniversary was among the most delightful of my life, as well as most interesting."

Two years later the forty-seventh anniversary was celebrated at Cleveland. That city alone successfully carried out the plan of erecting a monument to Perry, which on that day was dedicated. It stands in the park at Cleveland, and consists of a statue of Perry,

and of other appropriate sculptures. The dedication, September 10, 1860, was very largely attended. The governor of Rhode Island, with many of her civil and military officers, were present by special invitation. The two most important features of the literary exercises on that day were the oration by Hon. George Bancroft and a historical address by Dr. Parsons.

These three discourses relating to the battle of Lake Erie all give the story in essentially the same way, and show some unavoidable repetition. The two delivered at Put-in-Bay and Cleveland were not, however, controversial.

In his later journeys along Lake Erie, Dr. Parsons was regarded as a guest of the public, and was passed and entertained as such on the steamboats and railroads. These various acknowledgments of his early services, and the kind reception of his historical discourses, after he had passed the age of 70, gave him the keenest pleasure.

Some other published writings, less known than those before mentioned, attest his permanent interest in his naval reminiscences. In 1836 he contributed to the *Naval Lyceum*, New York, an article on quarantine. In 1840 he published in the *Knickerbocker Magazine* a story, "The Avenger of Blood," founded on an incident that occurred on board the *Guerriere* in 1818. In 1850 he helped to agitate the question of the abolition of flogging in the Navy and wrote a pungent article on the subject for a New York newspaper. In 1862 he contributed to the New England Historical and Genealogical Register "Brief Sketches of the Officers who were in the Battle of Lake Erie."

A sketch of Dr. Parsons' career would be very incomplete if it did not allude to the tenacity with which he clung to early attachments, and the pleasure he took, during his mature and declining years, in revisiting the scenes of his boyhood and youth. Almost every summer, after he had gained an established position in Providence, he went to his native place and the neighboring towns where he had struggled with poverty and youthful ambition. No recreation gave him greater pleasure. He kept up intimate intercourse and correspondence with the relatives who still lived there.

He also reverted with the deepest interest to the region about Lake Erie, where he had laid the foundations of success. He revisited this region several times, besides the occasions already referred to, when he delivered historical discourses. In 1835, he made a tour to Lake Erie in company with Capt. Daniel Turner, who

commanded the *Caledonia* in the battle of September 10, 1813. They went from New York to Albany by steamboat, and thence to Black Rock by canal. The journey by canal occupied three days. Dr. Parsons minutely describes, in his diary, the localities at Black Rock, and enumerates the houses that were standing there in 1812, most of which were destroyed by fire in December, 1813. He could not determine the exact location of the barracks where he had been lodged in 1812. He was joined at Buffalo by Capt. Stephen Champlin, who commanded the *Scorpion* in the Battle of Lake Erie.<sup>24</sup> They visited the *Queen Charlotte*, captured from the British in that battle, and afterwards sunk in the lake. "A company of merchants lately bought the ships and have raised the *Queen* and refitted her. The captain received us politely and gave us some pieces of oak from her to make walking canes. Captains Turner and Champlin and myself made out an inscription to be put on a gilded cannon ball that is to be slung in her cabin. Said ball was taken from among her timbers; and, as we stated, was fired by the *Tigris*."

In 1836 Dr. Parsons went to the west in behalf of the "Smithfield Emigrating Land Company." He thus writes, September 4, 1836: "About three weeks since, I caught the western land-fever for speculation, which has ever since occupied my thoughts. Two weeks yesterday I attended a meeting at Scott's pond, and bought four shares. I was chosen member of the purchasing committee, to have my expenses paid." He was absent about seven weeks, went from Buffalo to Detroit, thence to Toledo, where he bought a horse for \$60, a saddle, bridle, and blanket for \$12. He then traveled horseback to Fort Wayne, Laporte, Chicago, Danville, and Indianapolis. His expenses on this journey, as charged to the company, were \$311.25, including the purchase of horse and outfit, which were sold for \$41. He then and subsequently bought land at different points in western states, and some of these investments, after entailing a long-continued burden of taxation and other expenses, became profitable many years later.

In 1838, he revisited Erie, after an absence of nearly twenty-four years. In his diary he mentions Cayuga Lake as almost the only place on his route to Buffalo which he recognized as having seen on his early march. He arrived in Erie late in the evening of July 5. "Friday, 6th, visited the court house at seven o'clock. Here I

<sup>24</sup> Capt. Daniel Turner, born at Staten Island, N. Y., Aug. 8, 1792, died in Philadelphia, Feb. 4, 1850. Capt. Stephen Champlin, born in South Kingstown, R. I., Nov. 17, 1789, a cousin of Commodore Perry, died at his residence in Buffalo Feb. 20, 1870.

received my wounded of the fleet about the 20th (24th) of September 1813." He called on many persons with whom he had been very well acquainted for two years; only one recognized him without aid, though many expressed great joy in meeting him. In the burying-ground he looked for the graves of Claxton, who died of a wound received in battle, and of other naval comrades. He writes:

I called on Captain Dobbins, who was a sailing-master in the war, now commander of the revenue cutter. I went with him to the Peninsula (Erie was formerly called Presqu'isle) and trod once more the deck of the *Lawrence*, now a hulk resting about east a quarter of a mile from the old blockhouse. Her deck is in a sound state; but the water comes nearly up to it, so that I could not see her hold. In this vessel I sailed in 1813, and was in battle. She was repaired the following year, and I went in her to Mackinac with troops under Colonel Croghan. She was sunk and remained so till within the last two or three years, when she was raised and proved to be perfectly sound. Took some pieces from her to make canes of.

The following day he visited James Miles, whose arm he had amputated the day after the battle on Lake Erie. "He did not recollect me, but on learning who I was shed tears of joy." His diary concludes thus:

This visit to Erie gave me indescribable pleasure. The thousand associations of pleasure and of pain; the fresh recollections of events, as if they transpired but yesterday, which a thousand objects served to call up, and many of which would but for this visit never have been revived; the pleasure afforded in taking old friends by the hand, after a separation of twenty-four years; the changes in looks; the changes in worldly condition for better and for worse; the grave-yard where lie the bodies of great numbers of early friends; the changes and vast improvements about the city—elegant houses and churches where there were then but a few humble dwellings—all, all tended to render my stay here one of the most intense interest, on many occasions so powerful as to take from me the power of speech. But what shall I say of the protecting mercy of Him who through dangers seen and unseen, perils by land, perils in the deep, has surrounded my path, and preserved me to the present moment? May the remainder of my days be more devoted to His Service.

In 1854, after attending the meeting of the American Medical Association at St. Louis, he journeyed to Chicago and St. Paul, visited the Falls of St. Anthony, and returned by the way of Buffalo, Montreal, and Quebec. The next year he went to Lake Superior with his nephew, Edwin. On his way he rehearsed on the spot his

adventure in the capture of Fort Erie in 1813. He stopped at Mackinac and Sault Ste. Marie and examined and described the copper-mines at Lake Superior.

For several years before his death Dr. Parsons was almost wholly withdrawn from active practice, though he sometimes visited in consultation and even performed some surgical operations. His last amputation was of the forearm, performed when he was 74 years old in Rehoboth. His sturdy health of body and mind gradually failed, but with very little suffering, and with many circumstances fitted to make old age happy. An increasing forgetfulness in regard to business matters, and hesitancy in speech and uncertainty in locomotion showed that his powerful brain was yielding to the natural changes in its texture; but he still enjoyed reading, frequented the Athenæum, called at the houses of a few familiar friends, kept up a rather extensive correspondence, visited his near relatives in Maine and New York City, and interested himself in watching the progress of the Rhode Island Hospital. The exercises at the opening of this hospital took place October 1, 1868. He was conducted to a seat on the platform and was kindly referred to in Professor Gammell's eloquent discourse. This compliment, the last he was ever to receive on any public occasion, gratified him very much. He wrote in his diary the next day with a trembling hand, "I feel very happy for yesterday's doings." He was present at the first important surgical operation performed there October 10.

On the evening of October 17, after exposure to cold, he had a severe, acute attack, involving the brain, and followed by persistent nausea, headache, and confusion of mind. He first left the house after this, November 3, when he voted at the presidential election. He continued to go out almost every day for a month more, but with feeble and uncertain steps and a degree of mental disorder that gave his family great anxiety. From December 4 he was again confined to the house, and mostly to his chamber, and died on the morning of December 19, 1868, aged 80 years and 4 months. He was very faithfully attended on the last sickness by his friend Dr. Stephen S. Keene. An autopsy showed chronic degeneration in the arteries and membranes of the brain and acute inflammatory disease in the cerebellum. This last probably dated from the 17th of October and was the immediate cause of death. His funeral was kindly attended by Rev. J. G. Vose, of the Beneficent Congregational Church. He was buried in Swan Point Cemetery. On the 1st of June, 1869, Hon. Samuel G. Arnold, president of the Rhode Island

Historical Society, read before that body, in accordance with previous appointment, a discourse "On the services of three distinguished members of the society who died during the year 1868," Albert Gorton Greene, William Read Staples, and Usher Parsons. The portion of it referring to Dr. Parsons closes with the following sentences:

Probably no man now living has so complete a knowledge of Indian traditions and history or is so competent to interpret their meaning as was Dr. Parsons. In his later years he retired from practice and devoted his time to these favorite pursuits, often making long journeys, even beyond the Mississippi River, always returning with some new discovery in Indian lore and some vivid impressions of the growing greatness of our country. He was a man in whom the love of country was strongly marked and whose fidelity to the flag never faltered in the darkest hour. His was a genial temperament and a kindly heart, with much of the jovial spirit of the seas in his hours of relaxation. We miss his familiar form in these seats at our stated meetings, and we miss his cordial greeting and his honest smile in the daily intercourse of life, for there are few families in this city where he was not a welcome guest and where during his long residence of nearly half a century among us his name had not become as a household word. Loved in life and honored in death, his memory will be revered by all who value those high qualities of manhood which were united in his character.

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# MILITARY MARKSMANSHIP IN RELATION TO COLOR OF EYES, RACE, AND OTHER FACTORS<sup>1</sup>

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## PRELIMINARY CONSIDERATIONS

IS THE ability to acquire proficiency in marksmanship with the military rifle in any way dependent upon, or related to the color of the eyes? A careful examination of the literature which is on file in the Surgeon General's Library fails to disclose any publication containing accurate information upon this question. While it is recognized that it is a matter of no material scientific importance, it seems, however, to be one of some general interest, since references to the subject in conversation and in the press are not infrequent. Consequently an attempt was made some months ago to compile statistics upon this and other factors which might have a bearing upon the ability of the soldier to demonstrate skill in rifle practice.

The names of approximately 3,500 individuals, including officers and enlisted men, both white and colored, who had displayed proficiency in shooting during the years 1910, 1911 or 1912, were secured from the Department General Orders in which it was formerly customary to publish each year the names of all those qualifying as marksmen, sharpshooters, or expert riflemen. The highest rating only was used for any of those who qualified in more than one of the different grades during the period in question. In addition to these, the names of approximately 2,100 others who had recently qualified were furnished by the senior medical officers at various stations in a reply to a letter from the Surgeon General's Office, dated March 9, 1920.

It was recognized that a number of factors might exert an influence upon the soldier's ability to qualify in marksmanship, or upon the grade in which he did so. Consequently, when collecting the data referred to in the preceding paragraph, a mimeograph form was prepared which provided space for recording the following information:

1. Name (both surname and Christian name).
2. Rank.

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<sup>1</sup> To qualify as an expert rifleman a soldier must score 253 points from a maximum of 500; a sharp shooter, 238; and a marksman, 202 (1).

3. Company.
4. Arm of service.
5. Number of regiment, if assigned to a combatant branch of the service.
6. Age.
7. Years of service.
8. Military qualifications in marksmanship<sup>1</sup> (recorded as expert rifleman, marksman or sharpshooter).
9. Date of highest qualification obtained.
10. Race (recorded as White, Negro, Filipino, Porto Rican, Indians, and others).
11. Nativity (recorded as American, Austrian, Canadian, Danish, English, German, Hungarian, French, Irish, Italian, Russian, Scandinavian, Scotch, Turk, and others).
12. Visual Acuity (recorded separately for the right and left eye as 20/20, 20/30, 20/40, 20/50, 20/70, 20/100).
13. Color of the eye (recorded as blue, gray, greenish, brown and black).
14. Color of the hair (recorded as flaxen, red, light brown, dark brown, black, and gray).

For the men who had qualified during or prior to 1912, the data in regard to race, nativity, visual acuity, color of eyes, and color of hair were obtained from the report of physical examination rendered when each individual last entered the military service; the other facts were secured from the Department Orders and the enlistment papers of the soldier. In the case of those whose names were furnished from stations, all data were supplied from local records by the medical officers making the reports.

In recording the color of eyes and hair, those colors were of necessity selected which appeared upon the individual physical examination forms. Subsequently, in studying the cases *en masse*, the eye colors were classified into two groups: first, blue, including the blue, gray, and greenish eyes; and second, brown, consisting of brown and so-called black eyes.

A superficial survey of the material obtained showed that apparently a number of factors were closely interrelated in their influence upon the ability of the individual to qualify in marksmanship, viz., color of eyes, color of hair, age, length of military service, rank, race, place of birth, and visual acuity.

Fortunately for the purpose of this study, data were available showing the color of eyes and of hair among approximately 100,000 World War veterans. When these soldiers underwent physical examination just prior to demobilization in 1919, certain anthropological data were collected and recorded for each of them. This work was carried out at stations located in various sections of the

country so that no one racial group should predominate, as might have been the case if all measurements had been taken at a single point. The data obtained, including those relating to the color of eyes and hair, were published in "Army Anthropology" (2). Of the 101,704 World War veterans for whom these particular data were recorded, 61,925 had either clear blue eyes or blue eyes with brown spots, and 39,779 had light brown or dark brown eyes. Classifying the first two groups as blue and the latter two as brown, gives in each 1,000 men 609 (608.88) with blue, and 391 (391.12) with brown eyes.

#### INFLUENCE OF COLOR OF EYES ON MARKSMANSHIP

Table 1 indicates that among the 5,512 soldiers qualifying either as expert riflemen, sharpshooters, or marksmen, 605 in each 1,000 had blue eyes and 395 had brown eyes. It is obvious that in this group of individuals who qualified the ratio of the blue-eyed to the brown-eyed men was practically the same as that prevailing in the general male population as indicated by the examination of 100,000 soldiers at date of demobilization. It consequently appears that the ability to qualify in military marksmanship is in no way dependent upon the color of the eyes. Table 1 also shows that the proportion of the blue-eyed individuals qualifying in marksmanship among the white soldiers was above the average for blue-eyed men in the general male population, white and colored, while the proportion of the brown-eyed marksmen among the Negroes was much above that for the general mixed male population. Practically all of the Negro soldiers qualifying in marksmanship had brown eyes, due to no superiority in eyes of that color but to the fact that practically all Negroes have eyes of that type.

Using the proportion of blue eyes to brown eyes among the Negroes who qualified in marksmanship as a measure of the probable proportion in the general colored male population, and deducting in that ratio 6,150 Negro soldiers (the approximate number included in the 101,704 men for whom the basic measurements were obtained in connection with the study of "Army Anthropology"), we obtain an estimate of 61,775 demobilized whites with blue eyes, and 33,779 with brown eyes. From these data the proportion of blue eyes to brown eyes for *white troops* only would be as 646 is to 354, or practically the same ratio as is shown in Table 1 among the *white* soldiers qualifying in marksmanship.

TABLE 1.—EYE COLOR BY RACE AMONG THOSE QUALIFYING IN MILITARY MARKSMANSHIP<sup>2</sup>

Race	Absolute numbers			Distribution per 1,000 <sup>3</sup>	
	Blue	Brown	Total	Blue	Brown
White.....	3,329	1,873	5,202	639.95	360.05
Colored.....	8	302	310	25.81	974.19
Total.....	3,337	2,175	5,512	605.41	394.59

COLOR OF EYES IN RELATION TO CHARACTER OF QUALIFICATION IN  
MARKSMANSHIP

Table 2 consists of two sections, Part I being for white troops and Part II for Whites and Negroes combined. This table was prepared to show what influence the color of eyes might have upon the ability to qualify in the higher grades of marksmanship. From the figures showing the distribution per 1,000 of those who qualified, it is apparent that there is no difference in the ability of white men with blue or with brown eyes to attain the highest grade (expert riflemen), the number for each being practically the same, 82.01 and 81.28). It appears, however, that there is a slight difference in the relative number who qualified as sharpshooters and as marksmen, more blue-eyed men qualifying as sharpshooters and more brown-eyed men as marksmen. This latter result is probably, however, due more to race than to color of eyes; thus nearly three-fourths of the brown-eyed Italians who qualified reached only the grade of marksmen (see Table 8).

Practically the same information for the White and Negro troops combined appears in Part II. Although the results shown are quite similar to those in Part I, it is, however, apparent that here the relative number of brown-eyed men who qualified as sharpshooters was increased, but that a smaller number qualified as expert riflemen. This was probably due to including the brown-eyed Negroes, of whom relatively a greater number qualified as sharpshooters, but a smaller number as expert riflemen, which is apparent from Table 3.

<sup>2</sup> The total number of qualified men considered in the various tables embodied in this article ranged from a maximum of 5,557 in Table 12 to a minimum of 5,493 in Table 3. This difference in the totals was due to the inability to secure complete data for all of the men. Only those cases were used in the several tables for which the definite information in question could be obtained.

<sup>3</sup> In this table as in Tables, 2, 3, 4, 5, 7, 8, 9, 10, 12, 13, and 14, the distributed figures in each line from left to right total approximately 1,000.00, the deviation above or below in no instance exceeding .01.

**TABLE 2.—CHARACTER OF QUALIFICATION BY COLOR OF EYES<sup>\*</sup>**  
Part I—Whites only

Eye color	Absolute numbers				Distribution per 1,000		
	E.R.	S.S.	M.M.	Total	E.R.	S.S.	M.M.
Blues.....	273	1,468	1,588	3,329	82.01	440.97	477.02
Browns.....	152	762	956	1,870	81.28	407.49	511.23
Total.....	425	2,230	2,544	5,199	81.75	428.93	489.82

Part II—Whites and Negroes Combined

Blues.....	276	1,468	1,593	3,337	82.71	439.92	477.37
Browns.....	166	924	1,081	2,171	77.46	425.61	497.92
..Total.....	442	2,392	2,674	5,508	80.24	434.28	485.48

RACE IN RELATION TO THE CHARACTER OF QUALIFICATION

From the distribution in Section B of Table 3, it is apparent that a larger number of Whites qualified as expert riflemen and as marksmen, while a much greater number of Negroes qualified as sharpshooters. In this connection it may be of interest to know what proportion of the men who were in the military service qualified in any one, or in all three of the grades. To obtain an approximation of the number who were in the Army, the mean strength as published in the Annual Reports of the Surgeon General (3), for the years 1910, 1911, 1912, and 1920, was taken (the year 1919 being excluded, due to the inclusion during that period of a large part of the war army which was demobilized during the year). The aggregate strength for the Whites was 389,505, and for the Negroes 19,386. Dividing each of these aggregates by 4, in order to reach an average figure approximating a one year's strength, we obtained for the Whites, 97,376, and for the Negroes, 4,847. By the use of these strengths, as the measure of the average number who were in the military service, the ratios in Section C were computed. It appears that a greater number of Negroes than Whites qualified, the relative number being 63.96 and 52.23. From these ratios in Section C it is again obvious that relatively more Whites qualified as expert riflemen, and more Negroes as sharpshooters. To what extent the larger number of expert

<sup>\*</sup>E.R. signifies expert rifleman; S.S. signifies sharpshooter; M.M. signifies marksman. These abbreviations are used in succeeding tables.

riflemen among the White troops was due to the inclusion of the commissioned officers and of the noncommissioned officers of the higher grades, a larger percentage of whom were Whites, may possibly be determined from Table 4. In like manner, to what extent the greater relative number of sharpshooters among the Negro troops was due to the longer service of the Negroes may possibly be determined from Table 5.

TABLE 3.—CHARACTER OF QUALIFICATION BY RACE

Race	Section A Absolute numbers				Section B Distribution per 1,000			Section C Ratios per 1,000 men in the Army			
	E. R.	S. S.	M. M.	Total	E. R.	S. S.	M. M.	E. R.	S. S.	M. M.	Total
White.....	426	2217	2540	5183	82.20	427.75	490.06	4.37	22.77	26.08	53.23
Colored....	16	164	130	310	51.61	529.03	419.35	3.30	33.84	26.82	63.96
Total....	442	2381	2670	5493	80.47	433.46	486.08	4.32	23.30	26.02	55.74

## MILITARY RANK IN RELATION TO CHARACTER OF QUALIFICATION

It is apparent from Table 4 that one-third of all of the officers who qualified did so as expert riflemen, an additional one-third qualifying as sharpshooters. On the other hand, approximately only one-ninth of the noncommissioned officers qualified as expert riflemen, and one-twentieth of the privates. We see furthermore that twice as many noncommissioned officers as privates qualified as expert riflemen, but a larger number of privates qualified as sharpshooters and marksmen, due here to the larger number of noncommissioned officers qualifying in the highest grade. It can be seen from these data how much the inclusion of a larger percentage of officers and noncommissioned officers with the Whites would modify the results of comparison by race, as set forth in Table 3.

TABLE 4.—CHARACTER OF QUALIFICATION BY RANK

Rank	Absolute numbers				Distribution per 1,000		
	E.R.	S.S.	M.M.	Total	E.R.	S.S.	MM..
Officers.....	10	10	10	30	333.33	333.33	333.33
Noncommissioned officers.....	275	1,003	1,118	2,396	114.77	418.61	466.61
Privates.....	160	1,384	1,567	3,111	51.43	444.87	503.70
Total.....	445	2,397	2,695	5,537	80.37	432.90	486.72

LENGTH OF SERVICE IN RELATION TO CHARACTER OF QUALIFICATION

Table 5 shows the regularly progressive effect which length of service had upon the ability of men, who qualified in marksmanship, to display the highest skill (expert rifleman). Thus only 36 of each 1,000 men who qualified with less than one year's service attained the grade of expert riflemen, whereas 139 of those who had over ten years' service did so. From the data which are available it is not apparent why a relatively larger number of men with one year's service (less than two years' service) qualified as sharpshooters than was the case with men of two or three years' service. Possibly the explanation may be that those with natural ability qualified as sharpshooters early in their military service, whereas those who lacked natural ability and who consequently required more instruction attained the higher degree of proficiency at a later date.

TABLE 5.—CHARACTER OF QUALIFICATION BY LENGTH OF SERVICE

Length of service	Absolute numbers				Distribution per 1,000		
	E.R.	S.S.	M.M.	Total	E.R.	S.S.	M.M.
1 year.....	37	448	527	1,012	36.56	442.69	520.75
2 years.....	27	192	345	564	47.87	340.43	611.70
3 years.....	46	337	552	935	49.20	360.43	590.37
4 years.....	47	325	278	650	72.31	500.00	427.69
5 to 9 years.....	132	563	539	1,234	106.97	456.24	436.79
10 and over.....	153	523	423	1,099	139.21	475.89	384.89
Total.....	442	2,388	2,664	5,494	80.45	434.66	484.89

From information published in the Annual Reports of the Surgeon General (3) for the years 1910, 1911, and 1912, it appears that during that period there was an aggregate of 153,784 men with less than five years' service in the Army, and 68,765 with over five years' service. Since some of these men were accounted for in each of the three years, it seems to be more desirable to obtain an average for the period by dividing by three. When this is done, we find the average annual strength for men with less than five years' service to be 51,261, and for those with over five years' service, 22,921. Aggregating the number of men who qualified with various lengths of service under five years, as shown in Table 5, and those with over five years, we obtain the following data:

TABLE 6.—CHARACTER OF QUALIFICATION BY LENGTH OF SERVICE OF THOSE WITH LESS THAN FIVE YEARS AND WITH OVER FIVE YEARS

Length of service	Absolute numbers			
	E.R.	S.S.	M.M.	Total
Less than 5 years.....	157	1,302	1,702	3,161
5 years and over.....	285	1,086	962	2,333

Ratios per 1,000 Men in the Army				
Less than 5 years.....	3.06	25.40	33.20	61.67
5 years and over.....	12.43	47.38	41.97	101.78

From Table 6 it is evident that for both the total number, and for each of the different grades, a larger proportion of individuals with over five years' service qualified. Most commissioned officers and noncommissioned officers of higher rank who qualify, fall undoubtedly in the group having five years' service or more. It is apparent how much this factor influences the findings in regard to the effects of race, since officers and noncommissioned officers, who are included and are predominately white, naturally increased the proportion of men who qualified in the highest grade of marksmanship.

It is the commonly accepted opinion, though, so far as is known, one which is unsupported by any statistical evidence, that relatively a larger number of Negroes than Whites reenlist in the military service, and that, consequently, colored soldiers have on the average a greater length of service. If this be true, the effect of the length of service upon the relative number who qualified as sharpshooters among the Negro troops is of material importance.

#### AGE IN RELATION TO CHARACTER OF QUALIFICATION

Table 7 shows that the relative number of those who qualified in the highest grade, expert riflemen, progressively increased through the age of 49, the number of those 19 years and under being 21 per 1,000, and of those 45 to 49 years, 152. The relative number of sharpshooters also increased through the age of 39, while that of marksmen decreased. This table is closely related to Table 5, showing the influence of length of service.



TABLE 7.—CHARACTER OF QUALIFICATION BY AGE

Age	Absolute numbers				Distribution per 1,000		
	E.R.	S.S.	M.M.	Total	E.R.	S.S.	M.M.
19 and under.....	4	63	120	187	21.39	336.90	641.71
20-24.....	111	753	1,033	1,897	58.51	396.94	544.54
25-29.....	142	771	793	1,706	83.24	451.94	464.83
30-34.....	90	451	400	941	95.64	479.27	425.08
35-39.....	52	205	173	430	120.93	476.75	402.33
40-44.....	30	103	121	254	118.11	405.51	476.38
45-49.....	11	30	31	72	152.78	416.67	430.56
50 and over.....	3	9	14	26	115.38	346.15	538.46
Total.....	443	2,385	2,685	5,513	80.36	432.61	487.03

RELATION OF NATIVITY TO COLOR OF EYES

Marksmanship is perhaps more dependent upon nativity than upon the color of eyes. It is consequently of interest in this connection to consider the color of the eyes among soldiers of different nationalities who have qualified in marksmanship. This information is contained in Table 8. Since Americans formed the bulk of all those who qualified, it is to be expected that the proportion of the blue eyes to the brown eyes among them will be practically

TABLE 8.—COLOR OF EYE BY NATIVITY

Nativity	Absolute numbers			Distribution per 1,000	
	Blue	Brown	Total	Blue	Brown
American.....	2,845	1,863	4,708	604.29	395.70
Austrian.....	44	44	88	500.00	500.00
Canadian.....	19	13	32	593.74	406.25
Danish.....	8	3	11	727.27	272.73
English.....	23	14	37	621.62	378.38
German.....	83	42	125	664.00	336.00
Hungarian.....	19	11	30	633.33	366.67
French.....	1	7	8	125.00	875.00
Irish.....	92	28	120	766.66	233.33
Italian.....	5	22	27	185.18	814.81
Russian.....	49	42	91	538.46	461.54
Scandinavian.....	79	10	89	887.64	112.36
Scotch.....	6	2	8	750.00	250.00
Other.....	73	73	146	500.00	500.00
Total.....	3,346	2,174	5,520	606.16	393.84

the same as that for the total, as shown in Table 1. This assumption we find to be correct. Thus, among all those who qualified 605 per 1,000 had blue eyes, and among the Americans, 604. From Table 8 we see that the races which were predominantly blue eyed, reading from the highest down, were Scandinavians, Irish, Scotch, and Danish; while those among which brown eyes predominated were French and Italians. The proportion of the Russians who were brown eyed was above the average; this was also the case among the Canadians, due probably to the inclusion of the French Canadians, and among the Austrians as a result of including Slavonic races of the then Austria-Hungary.

In this connection it is of interest to note how these results compare with the proportion of blue eyes and brown eyes in the European races, as published in "Army Anthropology" (2). There we find the following:

TABLE 9.—PROPORTION OF BLUE EYES TO BROWN EYES IN THE EUROPEAN RACES ("Army Anthropology," Table 127, p. 284)

Races	Distribution per 1,000	
	Blue	Brown
English.....	660.94	339.06
Germans.....	646.83	351.17
French.....	491.25	508.75
Irish.....	732.91	267.09
Italians.....	203.10	796.90
Scotch.....	713.50	286.50

From a comparison of Tables 8 and 9 it is apparent that the proportions are practically the same, with the exception of the distribution for the French. The inference to be drawn from this difference is that apparently a larger proportion of French with the Nordic element were included in the "Army Anthropology" statistics, while a large proportion of those with the Celtic element were included in the marksmanship statistics.

#### NATIVITY IN RELATION TO CHARACTER OF QUALIFICATION

The character of qualification among soldiers of different nativities presents some points of interest. These data are shown in Table 10 and indicate that apparently the color of eyes had little

effect upon qualification. Thus the relative numbers of the brown-eyed French and of the blue-eyed Scandinavians were very similar.

TABLE 10.—CHARACTER OF QUALIFICATION BY NATIVITY

Nativity	Absolute numbers				Distribution per 1,000		
	E.R.	S.S.	M.M.	Total	E.R.	S.S.	M.M.
American.....	372	2,059	2,260	4,691	79.30	438.93	481.77
Austrian.....	7	41	38	86	81.40	476.74	441.86
Canadian.....	6	12	14	32	187.50	375.00	437.50
Danish.....	1	5	5	11	90.90	454.55	454.55
English.....	4	13	20	37	108.11	351.36	540.54
German.....	5	56	62	123	40.65	455.28	504.07
Hungarian.....	2	13	15	30	66.67	433.33	500.00
French.....	1	2	5	8	125.00	250.00	625.00
Irish.....	14	50	57	121	115.70	413.22	471.07
Italian.....	1	7	20	28	35.71	250.00	714.29
Russian.....	3	37	45	85	35.29	435.29	529.41
Scandinavian.....	12	43	35	90	133.33	477.78	388.89
Scotch.....	1	9	4	14	71.42	642.86	285.71
Other.....	5	40	100	145	34.48	275.86	689.65
Total.....	434	2,387	2,680	5,501	78.89	433.92	487.18

Some approximation regarding the number of the men of the different nationalities who were in the military service during the years under consideration can be obtained from the tables showing enlistments by nativities in Annual Reports of the Surgeon General of the Army (3) for the years 1908 to 1911. The aggregates obtained from the tables were divided by four to reduce them to a one-year basis. Using these strengths as divisors, the ratios shown in Table 11 were computed. The race which had the greatest relative number qualifying is placed at the top of the table, and that with the least number, at the bottom.

From this table we see again that in marksmanship the color of eyes was of little importance as compared with that of race. Thus the largest proportion of the blue-eyed Scandinavians qualified in the total of the three grades, while the brown-eyed French and Italians stood second and third. A much larger proportion of the blue-eyed Scandinavians, however, qualified as expert riflemen, the proportion of them to the Italians in this grade being practically as 7 is to 1; while the Danish, who had the smallest percentage of men qualifying in the three grades, had a greater proportion qualifying as expert riflemen than did the Italians, who stood third for the totals.

TABLE 11.—CHARACTER OF QUALIFICATION BY NATIVITY

Race	Average strength, 1 year	Ratios per 1,000 men in the service <sup>a</sup>			
		E.R.	S.S.	M.M.	Total
Scandinavians.....	553	21.70	77.75	63.29	162.75
French.....	68	14.70	29.41	73.53	117.65
Italian.....	314	3.18	22.29	63.70	89.17
Austrian.....	986	7.10	41.58	38.54	87.22
American.....	56,234	6.62	36.62	40.19	83.42
Scotch.....	170	5.88	52.94	23.53	82.35
Irish.....	1,632	8.58	30.64	34.92	74.14
Hungarian.....	452	4.42	28.76	33.19	66.37
German.....	1,921	2.60	29.15	32.27	64.03
Russian.....	1,331	2.25	27.80	33.81	63.86
Canadian.....	555	10.81	21.62	25.23	57.66
English.....	766	5.22	16.97	26.11	48.30
Danish.....	237	4.22	21.10	21.10	46.42
Others.....	599	8.25	66.77	166.94	242.07
Total.....	65,816	6.59	36.27	40.72	83.58

<sup>a</sup> The absolute number for each nativity and for the total is shown in Table 10.

## VISUAL ACUITY IN RELATION TO COLOR OF EYES

Table 12 exhibits the relationship between color of eyes and visual acuity, right eye and left eye separately. From Section B of this table it is apparent that the men with acuity of 20/20 were characterized by the same proportion of blue eyes and brown eyes as was the general male population. It is also apparent that there was little difference in the visual acuity of the right and left eye.

TABLE 12.—RELATION OF EYE COLOR TO VISUAL ACUITY AMONG SOLDIERS QUALIFYING IN MARKSMANSHIP

Visual acuity	Section A. Absolute numbers						Section B. Distribution per 1,000 to eye color			
	Blue eyes		Brown eyes		Total		Blue eyes		Brown eyes	
	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.
20/20	3182	3155	2073	2081	5255	5236	605.52	602.56	394.48	397.44
20/30	130	129	92	72	222	201	585.58	641.79	414.41	358.21
20/40	26	37	17	14	43	51	604.65	725.49	395.35	274.51
20/50	10	11	8	11	18	22	555.55	500.00	444.44	500.00
20/70	11	17	5	9	16	26	687.50	653.85	312.50	346.16
20/100	3	13	.....	6	3	19	1000.00	684.21	.....	315.79
Total.....	3362	3362	2195	2193	5557	5555	605.00	605.22	395.00	394.78

VISUAL ACUITY IN RELATION TO THE CHARACTER OF QUALIFICATION

Circular No. 5 (4), which was published by the War Department under date of January 25, 1908, gave in detail the result of a series of experiments conducted by Lieut. Col. J. M. Banister and Maj. Henry A. Shaw, stating among other points "That a visual acuity of 20/40, or even 20/70, in the aiming eye is consistent with good shooting, provided that the soldier is able to accurately focus the sights of his rifle." As a result of these observations, the requirements for enlistment in the line of the Army and in the Signal Corps were reduced to 20/40 for the better eye and 20/100 for the poorer eye, provided that no organic diseases existed in either eye (Circular No. 4, Jan. 24, 1908). Maj. Roderic P. O'Conner, M. C., U. S. Army, who disagreed with the findings of the board, published an extensive article upon the subject in the *Journal of the Military Service Institute of the United States* (5).

A small amount of material which may have some bearing upon this subject, has been assembled in Table 13. It is apparent in this table that, for both the right and left eye, the ability to qualify in the higher grades of marksmanship diminishes as the visual acuity decreases; this is true practically throughout for the sharpshooter class and until a visual acuity of 20/50 is reached for the expert riflemen. Among these latter (expert riflemen) there is a comparatively small number of men with a visual acuity of 20/50 or less. Possibly this group may have consisted largely, if not entirely, of officers whose visual acuity was corrected to normal by the use of glasses.

COLOR OF HAIR IN RELATION TO COLOR OF EYES

While the relationship of hair color to eye color is somewhat foreign to the subject at hand, Table 14 is introduced because it contains some material which may be of value in showing that so far as color of eyes and hair is concerned, the soldiers qualifying in marksmanship were a true cross-section of the general male population. This table sets forth the already well-known fact that the color of hair and the color of eyes are closely related. Thus practically all those with flaxen hair who qualified in marksmanship had blue eyes, while nearly all those with brown eyes had dark hair.

TABLE 13.—CHARACTER OF QUALIFICATION BY VISUAL ACUITY

Visual acuity	Absolute numbers						Distribution per 1,000							
	E.R.		S.S.		M.M.		Total		E.R.		S.S.		M.M.	
	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.	R.E.	L.E.
20/20.....	422	413	2,302	2,291	2,510	2,511	5,234	5,215	80.62	79.19	439.82	439.31	479.56	481.50
20/30.....	15	19	76	73	132	109	223	201	67.26	94.53	340.81	363.18	591.93	542.29
20/40.....	1	3	11	15	31	34	43	52	23.26	57.69	255.81	288.46	720.93	653.85
20/50.....	2	3	4	2	12	17	18	22	111.11	136.36	222.22	90.91	666.66	772.73
20/70.....	2	2	3	10	11	14	16	26	125.00	76.92	187.50	384.62	687.50	538.46
20/100.....		2	.....	4	3	13	3	19	.....	105.26	.....	210.53	1000.00	684.21
Total.....	442	442	2,396	2,395	2,639	2,638	5,537	5,535	79.82	79.85	423.73	432.70	487.45	487.44

TABLE 14.—RELATIONSHIP BETWEEN EYE COLOR BY HAIR COLOR

Hair color	Absolute numbers			Distribution per 1,000	
	Blue	Brown	Total	Blue	Brown
Flaxen.....	133	10	143	930.07	69.93
Red.....	96	23	119	806.72	193.27
Light brown.....	1,248	327	1,575	792.38	207.62
Medium brown.....	1,650	1,223	2,873	574.31	425.69
Dark brown.....	136	578	714	190.48	809.52
Gray.....	98	27	125	784.00	216.00
Total.....	3,361	2,188	5,549	605.69	394.30

#### CONCLUSIONS

1. One of the most important factors in a soldier's ability to qualify in military marksmanship is his length of service, the increase in percentage of successful qualifications, particularly in the higher grades, probably depending upon the training received.

2. The percentage of those qualifying in the highest grade increases with age, depending apparently upon the increase in length of service.

3. A higher percentage of officers and noncommissioned officers qualifies in the grade of expert riflemen, due apparently to greater length of service, as well as possibly in part to superior general physique.

4. A larger percentage of Negroes than of Whites qualifies in military marksmanship, due probably to a greater length of service among the former. However, a larger ratio of Whites qualified as expert riflemen, this circumstance probably resulting from the inclusion among them of commissioned officers (all white) and a relatively greater proportion of the higher grades of noncommissioned officers.

5. Apparently the South Europeans qualify in military marksmanship as readily as do the North Europeans, though a larger percentage of the latter qualified in the grade of expert riflemen.

6. Based on the small amount of data available, apparently the ability to qualify in the higher grades of military marksmanship decreases as visual acuity diminishes, the only exception being among officers, who may have worn glasses correcting refractive errors.

7. The proportion of blue eyes to brown eyes among soldiers

qualifying in military marksmanship did not differ from that in the general male population as represented in the Army during the World War.

8. The proportion of blue eyes to brown eyes was the same among soldiers of the different races and nativities who qualified in military marksmanship as among the same groups in the general male population as represented in the Army during the World War.

9. The proportion of blue eyes to brown eyes among those with normal vision who qualified in military marksmanship was the same as in the general male population as represented in the Army during the World War.

10. The relation of color of hair to color of eyes among those qualifying in military marksmanship was the same as in the general male population as represented in the Army during the World War.

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# THE FATE OF AN INTRA-OCULAR FOREIGN BODY

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(With one chart)

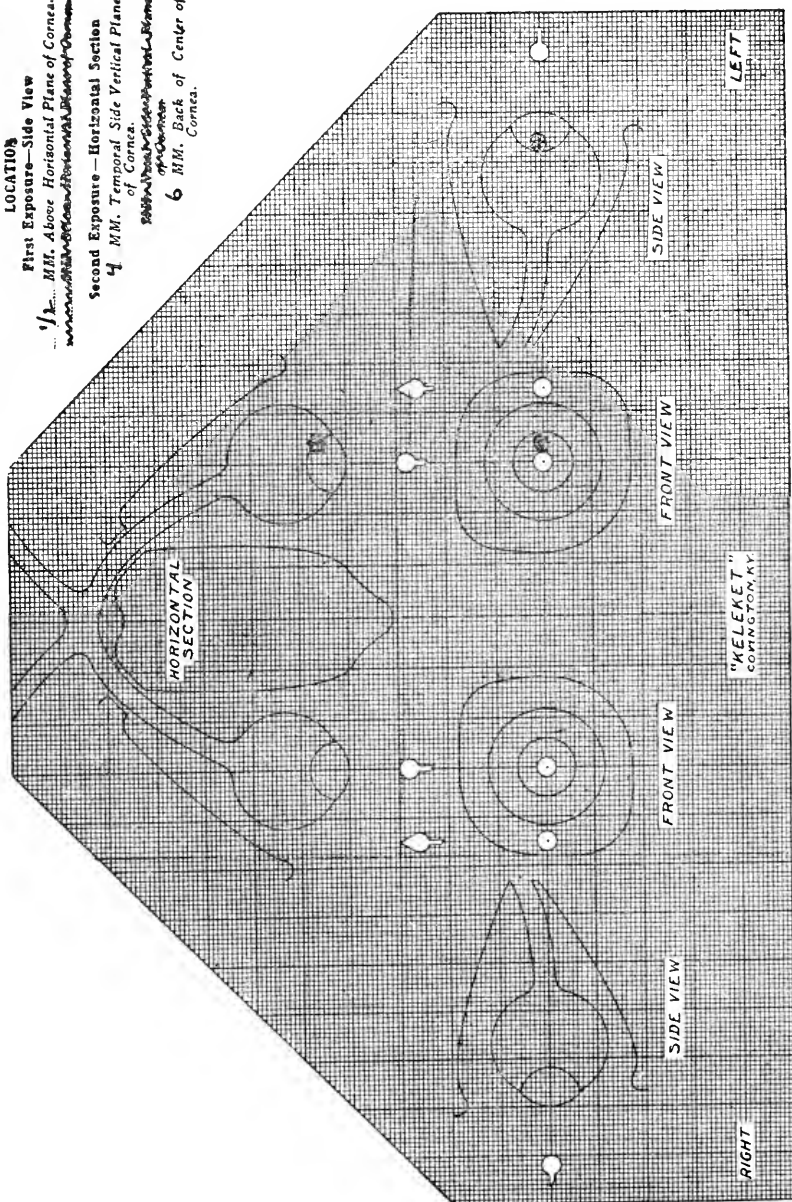
A RETAINED intra-ocular foreign body is of import only in so far as it affects the future of the eye, either anatomically or functionally. Consequently, judgment obtained by the observation of eyes with retained foreign bodies is of value in determining the procedure to be adopted in future injuries. An unusual result, therefore, justifies a single case report, particularly if, during the course of the case, there has been any marked deviation from the usual course of such cases. Such is the excuse for presenting the following case in detail:

John R. Aged 40 years. Seen November 23, 1921, with the following history: On October 12, 1921, while engaged in superintending wire drawing in a steel mill, felt something fly into his left eye. He merely considered it to be some of the soap through which the wire was being drawn and paid no further attention to it, as the smarting stopped within a few minutes. On November 11, 1921, first noticed some blurring of the left vision. He knows of no other possible injury. Other history regarding the eyes of no import. Status Praesens.

Right eye normal in every respect. Vision—1.2.

Left eye: Externally pale but flushes easily on manipulation. Conjunctiva normal. In the cornea at axis  $45^{\circ}$ , some 5 mm. from the limbus, is a gray linear scar, 2 mm. long, less than  $\frac{1}{2}$  mm. wide, lying at an oblique axis, and with a dichotomous branching at the upper end. The area is completely healed and is covered with normal epithelium. Cornea otherwise normal. Anterior chamber normal. In the iris, corresponding in position to the corneal scar, is a through and through hole, 1 mm. in diameter, with slightly atrophic edges. Through the hole, the lens, which is slightly opaque at this point, can be seen, as can the red fundus reflex. There is some granular pigment distribution on the iris. The pupil is round, free, and reacts normally. On the anterior lens capsule below the pupillary area is a microscopic crescent of semidetached, delicate capsular opacities of a bone corpuscle shape (evidently congenital remains). With the pupil dilated, in the upper outer quadrant of the lens, corresponding in location to the scar in the cornea and the hole in the iris and located, about 1 mm. under the anterior capsule, can be seen a metallic foreign body. It is surrounded by some opacity of the lens tissue and, with the slit lamp, its path through the lens can be traced by the faint gray line of opacity that remains. The anterior capsule at this point shows a distinct thickening. The posterior capsule in the pupillary area shows a striate opacity in an almost multiple-point stellate form. The remainder of the lens is normal. The fundus is seen hazily, but seems normal. The vision varies between 0.2 and 0.3. The tension is normal.

SIZE OF BODY  $\frac{1}{4}$  by  $\frac{1}{4}$  by  $1\frac{1}{2}$  MM.  
 LOCATION  
 First Exposure—Side View  
 $\frac{1}{2}$  MM. Above Horizontal Plane of Cornea.  
~~Second Exposure—Horizontal Section~~  
~~Horizontal Section~~  
 Second Exposure—Horizontal Section  
 $\frac{1}{4}$  MM. Temporal Side Vertical Plane  
 of Cornea.  
~~Third Exposure—Side View~~  
~~Side View~~  
 6 MM. Back of Center of  
 Cornea.



X-ray localization showed there to be a foreign body  $\frac{1}{2}$  mm. above the horizontal plane of the cornea, 4 mm. to the temporal side of the vertical plane of the cornea, and 6 mm. back of the center of the cornea. This corresponds absolutely with the visible location of the foreign body. The size of the foreign body as determined by the X-ray is approximately  $\frac{1}{4}$  by  $\frac{1}{4}$  by  $1\frac{1}{2}$  mm. There was no subjective or objective response to the application of a moderate sized magnet, and the large magnet was not used for fear of damage.

A course of expectant treatment was decided upon, and the patient was given 10 per cent dionin to drop into the eye once a day, and a wash of 1 per cent sodium iodide with which to bathe the eye for ten minutes once a day. The eye was observed with a dilated pupil every two or three weeks and no change was recorded until March 7, 1922.

March 7, 1922: The iris seems to be slightly more pigmented, but is not discolored. The foreign body is so surrounded by opaque lens tissue that it cannot be seen. There is a faint brown discoloration of this tissue. Toward the lower periphery of the lens there is a small crescent of faint brown dots under the anterior capsule, the first evidence of siderosis. The vision is still 0.3.

May 11, 1922: The iris is becoming slightly darker. On the nasal half of the anterior lens capsule are some microscopic dots of brown siderosis. The vision is still 0.3.

June 12, 1922: The iris is distinctly browner. Distinct areas of siderosis are clearly visible scattered over the anterior lens capsule, as well as in the anterior lens cortex. The lens has become so diffusely opaque that the foreign body can no longer be seen and only with difficulty can its area be localized. The fundus is not visible. Vision is less than 0.1.

On that same date, under good local anesthesia, a one-third Graefe incision was made in the cornea. A large capsulotomy was done with the cystitome, and the lens delivered easily. Considerable cortex remained in the lens bed, the most of which was removed with a Jaeger spoon. The iris root was incised peripherically under the incision to prevent prolapse, the iris toilet was made, and the eye closed. Recovery was uneventful, and six weeks later the eye was pale, the pupil round, central, and reacting normally. A small amount of cortex and capsule was visible in the extreme periphery of the pupillary area. The traumatic and operative wounds of the iris were well open. The fundus, which was clearly visible, showed no pathological conditions on careful search. With + 9.50 s+ 3.00 cyl ax 150°, Vision—1.2.

Immediately upon removal of the lens and cortex, a large magnet was applied to the extracted substance, but entirely without response. The lens was then crushed and examined with a Coddington loupe, but no foreign body was found. About ten days after operation, repeated roentgenograms were made of the eye without the slightest trace of a foreign body being demonstrable. What, then, had become of the foreign body that was so clearly visible before operation, or rather for a few months after the injury? One of three things occurred. First,

the foreign body may have been removed with the lens, but dropped during the short passage between the eye and the dish in which the lens was examined (a distance of not more than 30 cm.). Second, the foreign body may have fallen out of the lens before it left the eye and may have remained within the eye. Third, the foreign body may have become completely oxidized within the lens before operation and the semisoluble iron oxide thus formed carried away in the intra-ocular currents.

I do not believe that the first supposition holds, as great care was exercised to prevent that very occurrence, and furthermore, there was nothing but clean white linen underneath the lens in its passage from the eye to the dish. Had a metallic foreign body fallen there, it would have been detected. Certain it is that the foreign body was not in the tissue after it had been put into the dish. The second possibility was eliminated by the repeated roentgenograms that were taken after operation and by the absolutely quiet healing of the eye, a course that probably would not have been so without irritation had there been a retained intra-ocular foreign body. Thus the third possibility must be regarded as the probable fate.

There have been a very few instances of a foreign body retained within the lens for a long time without irritation and without siderosis and even without any cataract formation, other than at the site of the body. These were probably of very hard steel or of a type that does not rust easily. A non-infecting foreign body of soft iron or steel entering the lens does one of three things: First, there is a large tear in the anterior capsule, through which the lens cortex is absorbed, after which the retained foreign body remains caught in a capsular mass or else falls to the bottom of the lens bed, in both cases it being a source of continued irritation; second, there is produced a tear in the anterior capsule, but this eventually closes and the lens becomes opaque, and within this lies the foreign body that eventually produces a siderosis by oxidation; third, if the foreign body be very small and of the type that oxidizes readily, it may disappear by oxidation and leave lens tissue stained with the iron oxide. This is what in all probability occurred.



# REPORT OF TWO CASES OF SPINA BIFIDA OCCURRING AT FORT BENNING, GEORGIA

BY LIEUT. COLONEL HAYWOOD S. HANSELL  
*Medical Corps, United States Army*

(With three illustrations)

AS THIS condition has been reported but rarely in army circles, and particularly with cure by operation, it seems advisable to add these to the recorded cases.

I. Mrs. E. C., officer's wife, delivered in this hospital November 17, 1921, full term female child, L. O. A. Primipara. Family history discloses no congenital abnormalities on either side.

The defect is in the lumbar region. A pear-shaped mass covered with skin, and containing fluid,  $2\frac{1}{2}$  inches long by 1 inch wide, pedunculated, springs from the second and third lumbar region in the median line. At birth there was a spot on the sac the size of a dime that was dark and apparently breaking down. Three hours later this spot was the size of a quarter. At time of birth the left lower extremity showed some limitation of voluntary motion. The child did not use the limb at all freely. On passive motion there was no limitation.

Operation about five hours after birth. No anesthetic. Child in suspended position. Local disinfection with iodine quickly followed with alcohol, then sterile water irrigation. Incision near base of tumor, down to thin inner sac of meninges, which resembled a hydrocele sac. Linear incision into sac in longitudinal axis; wall of sac does not contain nerve tissue and is filled with spinal fluid. Sac dissected down to cleft in spine, ligated, excised and dropped back into spinal canal like a hernial stump. The defect in the spine was about one-half inch long and one-fourth inch wide. Closed by overlapping two V-shaped flaps of muscular fascia, one from each side held in place with mattress sutures, another layer interrupted sutures, of fascia, and a third of skin, continuous sutures. All suture material, fine 00 chromic gut. Simple dressing—recovery from operation uneventful.

At this time, eight months after birth, the child has complete muscular development and control of both lower extremities and is a normally developing infant.

This represents the simple or meningocele type of spina bifida. Its operative treatment approaches, in simplicity and method, that of an ordinary hernia.

Fig. 1 shows the infant at six months of age. The scar at the site of the meningocele is apparent.

II. Mrs. R. F., officer's wife, delivered in this hospital May 19, 1922, full term male child, L. O. A. Principara. Family history disclosed no congenital abnormalities on either side.

Fig. 2 shows original deformity, a circular ulcer in lumbar region,  $1\frac{1}{2}$  inches in diameter, with elements of cord spread out flat on surface. The outer part of the defect is covered with degenerative tissue. Spinal

fluid escaping over the surface in drops from time to time. Child has almost no motion in left lower extremity—limb is flaccid.

Operation three hours after birth. Child in prone position, belly resting on hot water bag and blanket. Light chloroform anesthesia. Iodine disinfection followed quickly with alcohol, which in turn was promptly washed off with sterile saline solution.

Dissection of unhealthy tissues in a circle, nerve elements gathered together in a cord and secured in that position with running suture of very fine catgut. Defects in bony canal involve second, third and fourth lumbar vertebrae. The second has an angulated tooth-like process on one side, with the distal end approaching the median line. The others have a straight tooth-like process on each side, standing erect.

Tissues cleared from outer side of each of these processes which were then partially divided with a knife at their bases and bent inward. A crescentic flap was then raised from each side consisting largely of the fascia of the erector spina muscles, base toward median line. These were mattress sutured and superimposed. Superficial fascia were then closed in another layer and skin last. Uneventful recovery from operation.

About one week after operation slight motion appeared in paralyzed limb. Nineteen days after operation the parents were ordered to a new station and took the child with them. At that time the defect in the back was firmly healed and the child could draw its leg up on belly, flex knee and ankle and toes and extend them, though not so freely as on the other side. Fig. 3 shows the resultant scar.

#### CONCLUSIONS

1. Simple cases of Spina Bifida (meningoceles) may be closed almost as easily as a hernia.

2. Severe cases of Spina Bifida (myeloceles, meningo-myeloceles, etc.) can be cured at least occasionally by prompt operation, where death is unavoidable otherwise. Immediate operation is believed to be an important factor in obtaining successful results, although this is usually deprecated in the literature on the subject.

3. Iodine and alcohol, quickly applied and quickly followed by sterile irrigation, seems to secure sterility without injuring the nerve elements appreciably. The iodine bites into the tissues almost immediately.





FIG. 1



FIG. 2



FIG. 3



IN MEMORY  
OF THE  
OFFICERS NURSES  
AND ENLISTED MEN  
OF THE  
MEDICAL DEPARTMENT  
UNITED STATES ARMY  
WHO LOST THEIR LIVES  
DURING THE  
WORLD WAR

THIS TABLET IS ERECTED  
BY THEIR COWORKERS OF  
THE MEDICAL DEPARTMENT



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In the new Army Medical School building, which is now in course of construction at Walter Reed General Hospital, Washington, D. C., the tablet shown on opposite page will be erected. Necessary funds for this purpose will be received by popular subscription, each subscription being limited to \$1.00, and the list of subscribers restricted to those who saw service as officers, nurses or enlisted men of the Medical Department of the Army during the recent World War. Each subscriber will receive an official acknowledgment and receipt. Fellowworkers desiring to subscribe for this tablet which commemorates the service of their comrades who fell while engaged in Medical Department work, are invited to forward \$1.00 to Lieut. Col. Paul C. Hutton, M. C., Office of the Surgeon General, Washington, D. C.

## CONDITIONS IN POLAND, 1919-1920

By CHARLES HALLIDAY, M.D.

*Formerly Major, U. S. A., A. E. F., Sometime Deputy Commissioner to Poland, and Field Medical Director, A. R. C., Commission to Europe*

(With two illustrations)

IT WOULD take a book to deal adequately with all the phases of conditions in Poland, and limitation of space prohibits more than a brief mention of relief work.

Poland has always been of such great historical interest that only references to her previous history will be made.

Formerly an important kingdom in Europe, whose territory down to 1914 was divided between Russia, Austria and Prussia. The capital of Poland was located at Cracow from about 1320 to 1620, when it was removed to Warsaw. At the period of its greatest extent, previous to 1660, it had an area of about 300,000 square miles, extending north to the Baltic Sea and the Gulf of Riga, westward to Brandenburg, southward to Hungary and almost to the Crimea, and eastward throughout most all the entire basin of the Dnieper River.

Poland was of large influences and promises until the eighteenth century, when it fell a prey to the more powerful neighboring states of Russia, Prussia and Austria. In 1772-1793 and 1795 occurred the three successive partitions of Poland, whereby all the territory in the kingdom was divided between the adjoining states.

At the outbreak of the World's War, in 1914, about six-sevenths of Poland was comprised in Russia. The portion of Poland which belonged to Austria comprised the crown lands of Galicia, and that belonging to Prussia comprised Posen, West Prussia, Ermland, and what is now known as East Prussia.

In 1915 the Germans defeated the armies of the Czar, captured Warsaw, and occupied a large portion of Polish territory in Russia. Under the separate peace signed with the Bolsheviks, in 1918, Germany was granted control of Russian Poland.

The American Red Cross Commission to Poland was organized at the Paris headquarters of the Red Cross early in February, 1919. This action was taken in response to urgent requests from the government and relief societies that urgent assistance was necessary to fight disease and epidemics that were working havoc with the people in their struggle for continued existence as a free and independent state.

The first contingent of the American Red Cross Commission for Poland left Paris about February 20, 1919. There were close to fifty people from all parts of the United States in the commission, which was

headed by Lieut. Col. Walter C. Bailey, an eminent physician of Boston, Mass. Other prominent members of the mission were Dr. Frances E. Fronczak, Health Commissioner of Buffalo; Dr. A. J. Chesley, executive officer, Minnesota State Board of Health; and many other well-known physicians.

That the aid of the Red Cross could not arrive in Poland a moment too soon was shown by messages received daily. These stated that typhus had assumed an epidemic form and was extending to all parts of the country.

Before leaving Paris with his relief expedition, Colonel Bailey had a final conference with Wacław Janasz of the Polish National Relief Committee, who had several private telegrams telling of the tragic conditions in his motherland, which were hourly growing worse. Not only was typhus ravaging the country, but cholera, smallpox and trachoma were taking a heavy toll of lives. Count Alexandre Szembek, representing the Polish Red Cross, who had just arrived in Paris, said, "the very presence of American men and women in Poland would prove a great moral factor to his countrymen."

The original group of Americans and Polish-Americans arrived in Warsaw March 3, 1919. First of all the Red Cross found that there was no centralized information regarding the actual requirements extending over any considerable area of this district. It therefore set out at once to gather information from all sources. Accurate statistics on anything were absolutely unobtainable in Poland. For this there were several obvious reasons: First, the country was new and organization lacking or imperfect; second, the officials and district doctors were so busy caring for the great needs directly at hand that they had but little time for gathering information; third, transportation in all parts of the country was most difficult, trains few and undependable, motor cars conspicuous only by their absence, horses scarce and slow—in fact, transportation so difficult that it was an impossibility for a district commissioner or doctor to thoroughly cover a district of any size; fourth, with the movement of the Polish Army the extent of territory in Polish hands was constantly changing; and fifth, the population of each district constantly increasing with the influx of returning refugees. Crops did not amount to more than 20 per cent of normal, the number of horses about 25 per cent of what they were before the war, and the number of cattle about 20 per cent. Clothing could be bought in the cities, but only at fabulous prices, prices which practically no one was able to pay.

In March, 1919, the Poles had troops on the following fronts: (1) Northeastern or Lithuanian; (2) Southern or Czecho-Slovak; (3)

Southeastern or Ukranian; (4) Eastern or Bolshevik; (5) Western or Posen.

On the northeastern or Lithuanian front, the Poles were facing but not fighting the Lithuanians who were holding a line from Grodno northward toward the Vilna which was held by the Bolsheviks. German troops were leaving this territory, homeward bound, and in their withdrawal were promising to turn over the evacuated territory to three forces, i.e., the Poles, Lithuanians and Bolsheviks.

On the southeastern, or Ukranian front, the Poles were opposing the Ukrainians who held a line from the outskirts of Lemberg to Przemyśl westward and north from Lemberg to Loutsk.

On the southern, or Czecho-Slovak front, the Poles were opposing but not fighting the Czechs from the neighborhood of Przemyśl where they join up with the Ukrainians to Teschen.

On the eastern, or Bolshevik front, the Poles were fighting the Bolshevik on a line running northward from Loutsk to just south of Grodno. In the territory north of Grodno the Germans were fast withdrawing toward Koenigsburg.

On the western, or Posen front, the Poles were opposing the Germans who controlled the railroad from Mława northward through West Prussia to Danzig. The Poles were then in Posen, the Germans just outside the town.

Mr. Paderewski, the Premier of Poland, said "that after food the most imperative need of Poland was clothing and footwear for 2,000,000 people." Then, by way of illustration, he led his listeners to the window of his hotel and pointed to the barefooted women and children in rags walking in the leading thoroughfare of Warsaw. Mr. Paderewski based his figures on reports prepared by his Ministry of Labor and Public Welfare.

Prof. Vernon Kellogg, on his departure from Warsaw, made the following statement: "It will take a year to put Poland on her feet. There are at least 5,000,000 people scattered over 10,000 square miles, who are worse off than were the Belgians, because they have been without any help whatsoever for four years. They are dependent upon the Allies for food, clothing, hospital supplies and medicine; and I do not believe that the Allies have a more important duty to perform than to hasten all available assistance to Poland. The United States Food Administration has shipped in 80,000 tons of foodstuffs, but that is not enough. We must send in that much each month." Thousands of Polish people died of actual starvation. I have seen the dead in refugee camps, whose emaciated bodies clearly showed the cause of death.

Poland was not only experiencing a food famine but also a scarcity of all kinds of transportation, such as locomotives, automobiles and horse vehicles. The question of transportation was, therefore, paramount. No matter how much food, clothing or medicine were sent to Warsaw, or any other central point, there must be transport to get it to the place where most needed, i. e., the little villages away from the main arteries of travel. It is not that the country is one of impassable mountain ranges; quite the contrary—it is as flat as a table and has great stretches of marshes, especially along the eastern border where the roads are inundated. In this immense eastern territory, east of the River Bug, where the greatest distress prevailed, there are great corduroy roads built by the Germans. These German roads parallel the railroad from Brest-Litowski where the Germans forced the Russians to sign the treaty of Brest, and to Cholm and Kowel, cities of 25,000, and then again due east from Brest to Pinsk, on what was a border town on the Pripet between Poland and Russia. But these roads were along the main arteries of travel and had no offshoots to the small villages tucked away back of the railroads where the relief was most needed.

East of Warsaw the most important railroad center is Brest-Litowski. From this once thriving city radiates good railroad lines northward 100 miles to Bialystok, and then another 100 miles farther north to Grodno. Both Bialystok and Grodno were important places from which to distribute relief to the surrounding country.

For 100 miles due east of Brest-Litowski the railroad runs to Pinsk on the Pripet marshes. It is the only line into Pinsk; east of it the line which runs all the way to Moscow was in the hands of Bolshevick.

Kowel, another important relief center, 100 miles southeast of Brest, is reached from there by a good railroad line. Eastward of Kowel the railroad was in the enemy lines, but southward there was a good road to Wladimir Wolynski and Rawaruska, not far from Lemberg.

Taken as a whole, the roadbeds in this part of Poland were in good condition, the equipment, rolling stock and locomotives in poor condition. Locomotives were especially scarce, and those in commission had leaky boilers and had to be filled with hand-buckets.

One of the first things done was to visit the nearest refugee camps and military hospitals and to investigate conditions in the outlying districts such as Lodz, the big textile center, Dombrowa, Bendrin, and Czestochowa in the mining area and from other lesser-known places where there was intense suffering and epidemics due to the lack of everything necessary to keep body and soul together.

Warsaw itself had enough distress to keep relief workers busy for many months. In a big military hospital nearby, crowded with 1,500 patients, there had been no heat for two weeks and there was such lack of blankets and bed linen that the patients were covered with their own overcoats. In fact the fuel famine was so acute that whenever the surgeons had to perform an operation they had to break up hospital furniture for a fire to boil water to disinfect their instruments. Rubber gloves had ceased to be but a memory, and for aprons they had toweling sewed together. Two hundred well and discharged patients were unable to leave the hospital and rejoin the army because they had no clothing. The hospital laundry went out of business a month previous for lack of fuel. For these 1,500 patients there were but 30 nurses. Soap had long ceased to exist in this locality, and children of five, born just before the war, did not know what to do with soap that was given them. This lack of soap also helped trachoma and other eye diseases to flourish.

But the greatest unemployment in any district of Poland existed in Lodz, which had a population of 400,000, half of whom were idle. This was due to lack of raw material for the weaving mills and to the dismantling of their machinery by the Germans.

Conditions in and about Brest-Litowski and Pinsk are cited as typical examples of the majority of towns.

Brest looked as if an earthquake had merely circled the city but had left the interior intact. The Russians dynamited or applied the torch to every modern building or dwelling, and the first impression from the railway was a heap of bricks. There were no shell holes in the few walls that resisted the explosions; the natives that did not flee with the retreating troops said the Russians never fired a gun from the ring of forts around the town but simply destroyed the best buildings and went away days before the Germans approached.

Every day brings hundreds of former residents back from their refuge in Russia and with them the dreaded typhus which was working such havoc among the inhabitants that there was scarcely a street that did not have a funeral every day. There was no sanitation, and the authorities were without sufficient force to compel efforts at cleanliness. All the doctors had been taken for the military. Unless the efforts being made to check typhus were successful, there would follow as soon as the warm weather came an epidemic of dysentery and cholera. Typhus had spread even to the forts around the city which were now occupied by refugees who returning from distant parts of Russia, and, finding their adjacent villages destroyed, had taken possession and lived in the dugouts under the embattlements. Three and sometimes

more families existed in one of these dark, unsanitary chambers. In one a family lived with a child down with smallpox. There was typhus in many others. Few, if any, of the refugees appeared to realize the situation and seemed to take the whole business as a matter of course.

The same pictures of suffering and destitution were seen all over the city. The military and civil authorities were making a brave attempt to establish some sort of order, but they frankly confessed their inability to accomplish much owing to lack of disinfectants, medicine and food. Besides, the soldiers were underfed and so poorly clad that many of them had no underwear and had been wearing the same clothes for three months without a change. There was no mistaking the fortitude and cheerfulness of the youthful Polish troops, who were ill-clad and underfed. They had no overcoats or blankets, and some were without uniforms. Almost everything they wore, except the cap, was German. The Germans had abandoned large stocks when they started on their long journey homeward in January last. The daily ration for the men out here in the snow and biting cold was a cup of coffee, very poor bread, and a tin of water-like soup. The only quality of the latter was that it was hot. Yet here the troops were surprisingly free from typhus. There were no hospital facilities, and the wounded had to be shipped all the way to Warsaw. The only doctor on this front was awaiting the arrival of a hospital train which was coming from Vienna. It was a Maltesian Knights train which had been turned over to Poland in liquidating the affairs of the Galician branch of the American Red Cross.

#### PINSK

The most distressful, famine-stricken, disease-ridden city in Poland was Pinsk, on the borderland of Poland and Russia. Typhus and hunger were everywhere. Everybody was under-nourished and almost everybody was unclean. The birth rate had fallen to seven per thousand and the death rate had risen to twenty-nine per thousand.

Pinsk is a little more than 200 miles east of Warsaw in the unhealthy Pripet marshes, where the Germans halted their pursuit of the Russians and dug themselves in. The trip from Brest-Litowski, a distance of 125 miles, took ten hours; the boilers of the rusted old engine leaked so badly that frequent stops had to be made to give all hands a turn at passing water-pails. The weather was bitterly cold, and a company of poorly clothed young Polish troops stood shivering at attention before the windowless station, while inside was a nondescript crowd of Russian, Polish and Ukranian men, women and children refugees, all huddled together like sheep. Some of the little ones were crying, while the mothers regarded them with a look of utter hopelessness. These

refugees were returning from the far corners of Russia, many bringing typhus with them.

The city stands about 2 miles away from the railway, like the majority of towns in this part of the world. The streets, or mud-roads, were lined on either side with squatty, one-story, unpainted, weather-stained frame dwellings, that had a most forbidding exterior as if the disease inside said, "Don't come in." Two orphan asylums and an almshouse were without bread. Two public soup kitchens were closed for lack of food. Further on was a house, in one room of which five out of a total of sixteen occupants had succumbed to typhus in as many days. Two of the survivors had typhus, and the others were near death from starvation. There was not the slightest sign of sanitation anywhere, and the wonder was that a human being could venture into some of the hovels and live to tell of it.

The mayor or president of the city council, M. Jaworski, shrugged his shoulders when asked how many were down with typhus. He said there was no way of estimating—that everybody was so hungry nobody had energy enough to count them. No one in Pinsk was doing any work. The chief industry, a big match factory, was in ruins, having been fired by the Russians in their flight before the Germans. The Russians likewise destroyed the locomotive works, a barge building plant, a soap, and a shoe factory. The farmers had no horses or cows, no tools or seed.

The countryside about Pinsk was dotted with evidence of the German occupation. Running parallel to the railroad from Brest-Litowski to Pinsk was a German corduroy road built of timber cut from forests close by, and for several miles before Pinsk there were rusted barbed-wire entanglements and great piles of unused wire, steel rails and immense quantities of narrow-gauge railways, and here and there billets built by the Germans and the inevitable beer gardens, with benches, and an artistic fence of white birch.

The battle front around Pinsk was in the shape of the letter "V," in the lower end of which was Pinsk, jutting farthest into the enemy or Bolshevik lines. The Polish military command bundled the Americans into a fourth-class passenger car, and the only switch engine in the Pinsk yard pulled it out to within a mile of the front. The military deemed it unsafe to expose their only engine to the watchful eyes of the Bolshevik outposts. On the way the party passed the Polish field battery consisting at this point of two Russian brass cannon. The Bolshevik guns were in action, and the Polish field pieces were preparing to reply. Infantry and machine-gun squads occupied the German pill boxes, dugouts and trenches on the banks of the Jasielka River,



from which they overlooked the enemy positions on the opposite shores.

The mildness of the weather in Russia that winter was a godsend to tens of thousands of refugees pouring into Poland. Many of these were without shelter of any sort, and thousands who escaped the ravages of hunger and disease would have perished in the fields or along the roads if the weather had lived up to its traditional reputation for severity.

One did not have to go far east of Warsaw to see hundreds of refugees, Russians, Poles and Ukrainians, in their varicolored garments, trudging along the roadside with everything they possessed on their backs. They were returning to their homes from all parts of Russia, having been forced to flee by the Russian Army before it fired their villages in the face of the enemy back in 1915. Polish officers, formerly in the Austrian Army, said the first signal they had that the Russians were retreating was a sudden flare up at night from a score of villages along the front. Thousands of these people were able to get on trains and were carried off to Siberia, from which, owing to the chaotic state of everything in Russia, many would never return. Yet other thousands were managing to come back, and under conditions which were pathetic beyond description.

There was no railway travel in most parts of the country, and not many of the sturdy little Russian horses were left after five years of warfare. For example, in a whole day's travel in the immense territory east of the River Bug, not a single vehicle was seen. All the refugees—and they were the only people moving about—were on foot. Tramping along in single file, Indian fashion, by the roadside, they made a picturesque sight. Many of the women carried two children, one on the back in a shawl made into a basket and the other in the same manner in front. This arrangement left the arms free to carry several bundles. The headgear worn by the women consisted usually of a bright red shawl which had a touch of newness as contrasted with the generally ragged condition of their other raiment. The men, many of them still wearing the uniform of the Russian soldier, carried a sack or two of grain for seed. The children who were able to walk toddled along with the aid of a staff of wood twice their size. The striking thing about the children was that they had so much the manner of persons much older. Men, women and children wore the typical Russian boot, and it was a relief to notice the generally good condition of this footwear.

Sometimes the peasants carried a piece of household furniture, or pushed along a cartful of a varied assortment of things. The majority of these peasants had somehow managed to get through the German,

Lithuanian, Bolshevik or Ukranian lines east of the River Bug. To do this they would employ all sorts of subterfuges. They couldn't get through with a horse or wagon or much furniture or other household effects which they took with them in their flight eastward, without running the danger of being caught and perhaps losing their all. Their custom, therefore, was to entrust pieces of furniture, a cart or a horse to as many different peasants living up close to the lines and who were known to the occupying forces and who would not be stopped. If they were, they would say that they were merely carrying the picture frame or what-not to a neighbor's house. The refugees meanwhile came through empty-handed and were not suspected. The friendly peasants and the refugees would then rendezvous back of the Polish lines and the latter would again receive their effects and resume their journey to their former homes. Some would reach their villages, after weeks, only to find their thatched huts destroyed in the four years of war that followed their flight.

During the war about 750,000 workmen from Poland were forced to go to Germany to work. The Germans also took prisoner about 100,000 Polish troops.

Nearly all of those who found their way back to Poland were in great need of clothing and linen. For the refugees from Russia alone, 200,000 suits of clothes, 140,000 for adults and 60,000 for children were needed.

The incoming refugees made an enormous problem. It was estimated, in the spring of 1919, that over one and a half million men would have to be transported to or through Poland. These were divided as follows:

- 500,000 impressed Polish workmen in Germany.
- 15,000 Polish invalids and prisoners of war in Germany (formerly in the Russian Army).
- 20,000 Poles, prisoners of war in France (formerly in the German Army).
- 5,000 Poles, prisoners of war and refugees in England.
- 2,000 Poles, prisoners of war and refugees in the Baltic Provinces.
- 600,000 prisoners of war and refugees of diverse nationalities in Russia, part to return to Poland; part to be transported through Poland farther west.
- 40,000 prisoners of war and refugees in Turkestan (Asia) to be transported to or through Poland.
- 10,000 prisoners of war and refugees in the Caucasus.
- 60,000 prisoners of war and refugees in Roumania.
- 20,000 prisoners of war and refugees in Budapest.
- 27,000 prisoners of war and refugees in Austria.
- 6,000 prisoners of war and refugees in Serbia.

4,500 prisoners of war and refugees in Italy.

1,500 prisoners of war and refugees in Greece.

This did not include Ukrania or Lithuania.

These people entered Poland at various points and then passed on to the part of the country from which they came. Practically all of them were destitute of everything when they arrived, and they returned to find their homes burned and their land only a waste. Others were coming into the Department of the East at a total average rate of about 1,000 per day. Practically all had to be fed and clothed.

By June, 1920, the refugee problem seemed about solved; practically all the large groups of refugees had returned. As long as the army had continued to advance toward the east, each town captured added to this phase of relief work. With the retreat of the Polish army from Kief and nearly to Warsaw, this problem again became one of the most trying.

In July, 1920, the Refugee Commissioner, Mr. Pawlikowski, estimated that 300,000 refugees would pass through Bailystok, and an equal number would pass through Brest-Litowski.

The plan to handle the refugees as they journeyed on toward Warsaw was to establish soup kitchens at stated intervals along the railroad, where one meal a day would be served; also where the sick would be transferred to hospitals. (See insert, Map 1.) For those traveling by wagon-load, soup kitchens were to be established every 40 kilometers; at these stations also provisions were made for the care of the sick. As to disease among these refugees, it is only necessary to mention that typhus, typhoid and dysentery were prevalent among each group.

Diseased, starving and unclothed, they presented a pathetic sight; yet no sign of disorder was ever noticed among them.

One should keep the epidemiology of typhus fever in mind (that is, anything which favors the propagation of and dissemination of lice), the principal factors doing so; first, massing together of people of all classes; second, retaining these masses under conditions which render personal cleanliness and clean clothing difficult or impossible; third, lack of proper food, with its consequent lowered vitality; fourth, endemic foci. Thus, with conditions as they were, it was not surprising that the disease got beyond control.

Lack of personal cleanliness, and unsanitary conditions also favored the spread of such diseases as typhoid, recurrent typhus, dysentery, cholera, smallpox, trachoma, and skin diseases as seborrhoea, pyoderma, frunculosis, scabies, and ringworm.

It was estimated in the spring of 1919 that 10,000 were dying daily of typhus.

From investigation made by members of the American Red Cross, it was learned that every hospital was taxed to twice its normal capacity. This applied to both military and civil institutions. It was a usual sight to see two patients in a single hospital bed, patients on stretchers between beds, and on piles of straw in every available space in wards and halls. I have seen hospital after hospital crowded with 500 or more typhus patients, with from three to five medical officers, three to six nurses, and probably a dozen orderlies, trying to care for the needs of these patients, with hardly the bare necessities of an institution. In many instances the only drug on hand was a little camphorated oil. The typhus problem in one locality was typical of many:

A city of about 560,000 formerly over 750,000. During the winter 1919-20 there was a great epidemic of typhus in this city, there being 64,000 registered cases, which meant, of course, that twice that number actually had typhus. The registered number of deaths from typhus alone was over 20,000, a mortality of 10 to 12 per cent. People stated that at various times dead bodies lay on the streets, in yards, and various buildings for a long time without burial. The anatomical theater was jammed to the ceiling with bodies until there was such a stench that burial was finally carried out. In one of the cemeteries, in January, there were over 2,000 bodies lying unburied. For the year ending June 30, 1920, it was estimated that 200,000 died of typhus (including recurrent typhus) throughout the country.

About April 15, 1919, the American Red Cross established field units at Maciejow, Pruzana, Dolsk, and Bereza-Kartuska. These organizations and activities were as follows:

#### DOLSK

Dr. Emily Pratt was in charge of units at Dolsk, which is about 12 kilometers from the railroad station of Maciejow and is reached by a four-hour ride in peasant carts. This unit was located on the estate of Count Rzyaszczewski and was well adapted for the purpose on account of numerous suitable buildings and accessibility to a number of villages. The personnel consisted of two doctors, one warehouse man and about fifteen nurses and nurses' aides. A bakery was maintained at this place, producing between fifty to sixty loaves of bread daily. A canteen was in operation which provided one meal a day, consisting of soup and bread, to an average of 500 people. In view of the fact that this work covered a radius of 15 kilometers, community kitchens were established in the more distant villages, four already being active. The villagers operated these soup kitchens themselves, supplies and food being furnished by the Red Cross.

Delousing was under way, both at headquarters and in the home. With the small equipment at Dolsk, however, it was impossible to clean a whole village at once, with the result that those who had been through the process of sterilization rapidly became contaminated by mingling with those who had not.

After being bathed, peasants were clothed in pajamas and other garments provided by the Red Cross, while their own clothes were being sterilized.

The ten-bed hospital, which had four typhus cases, was maintained in connection with a dispensary. At the latter from thirty to fifty people a day received treatment. There were no doctors in this district, and the people, upon learning of the presence of the Americans, came from great distances for aid.

#### MACIEJOW

The detachment at Maciejow was under the direction of Dr. Eva E. Herzkine, a Polish doctor. The personnel consisted of one warehouse man, five nurses and nurses' aides. This unit was located in an old Russian hospital, used successively by the Austrians and Germans. This hospital also had four typhus cases. As at Dolsk, this community had also been long without doctors and the village barber was the only one to prescribe for the sick. He later worked in the hospital as orderly and also acted as interpreter.

Canteen work at first was confined to children, about eighty a day receiving milk or soup. The work of disinfecting progressed as the unit possessed an old Austrian delousing plant. The people were bathed and given clean garments while their old clothes were sterilized. Whole villages were cared for at a time in this manner.

Food and clothing were being distributed, some gratis, but mostly in exchange for labor. People working in the hospitals were paid in foodstuffs. On account of the high percentage of Jewish population here, as in most of the larger towns, cotton-seed oil was issued instead of lard.

The sanitary conditions of this locality, as in most all visited, were most deplorable. Wells were often seen in close proximity to open sewers and stagnant pools. An effort was made to remedy this state of affairs by digging drains and ditches. The labor was done chiefly by the peasant women.

#### BERAZA KARTUSKA

The unit at Beraza Kartuska was in charge of Dr. T. M. Barber. The personnel at this unit consisted of ten nurses' aides. The headquarters building was formerly occupied by the commander of the adjacent Russian barracks. The town is about 5 kilometers by paved

road from the railway station of Bluden and is on one of the great state highways—an excellent automobile road. The Red Cross cooperated with the local civil hospital, supplying medicines and other essential articles. A dispensary was maintained and visits averaged about fifty a day. The work of the unit covered about twenty villages. The distribution of food and clothing was organized here in the same manner as the other units.

There was much distress and suffering in the barracks nearby. Refugees returning from Russia along the great highway squatted here, and famine and disease were apparent on every hand. The people were absolutely destitute. A family of ten living in one room were seen cooking grass and weeds gathered in the field. This was only one instance.

PRUZANA

*Dr. Virginia Murray in Charge*

The personnel here consisted of a warehouse man and about twelve nurses and nurses' aides. This unit was located in a large Italian villa, formerly used by the Polish military, in a town of about 6,000 population. There were many adaptable buildings on the estate and this town had the advantage of accessibility by many auto roads, one being from the railroad station at Linowa, 12 kilometers distant.

In the summer of 1919, distribution trains in charge of American Red Cross personnel were operated. One train in charge of Dr. A. J. Chesley (later commissioner to Poland) was operated in the vicinity of Minsk. This train distributed supplies to nine hospitals, ten orphanages and refugee camps.

Later, under the organization perfected by Dr. Chesley, Poland was divided for relief purposes into three districts as follows:

1. Warsaw District, under jurisdiction of General Headquarters at Warsaw, includes all territory under Polish control west of a line running south from a point on the boundary north of Ostroleska, through Ostroleska, Sokolow, Siedloe, Lukow, Lubin, then west to the Vistula River and then south and west along the course of the Vistula River to the Polish boundary at Sosnewice.

2. Northern District, under jurisdiction of headquarters at Bialystok, includes all territory under Polish control east of the eastern boundary of the Warsaw District and north of a line from Siedlce through Brzesc-Litewski and Pinsk to the boundary.

3. Southern District, under jurisdiction of headquarters at Lwow (Lemberg) includes all territory under Polish control east of the eastern boundary of the Warsaw District, and south of the southern boundary of the Northern District.

Distribution of supplies in the Warsaw District was under Major

Bruce M. Mohler (then Deputy Commissioner). Dr. H. S. Diehl was in charge of the Northern District and Dr. E. C. Hartley in charge of the Southern District. Sub-sections were established in the Northern District at Baronowicze and later at Minsk. A sub-district was also maintained at Kowel, this unit later moving to Tarnopol in the Southern District. A unit was also established at Stanislawow. (See Map 1.)

Supplies, as they were received in Warsaw from Paris, were divided among the district headquarters, which kept their field units supplied as needs arose.

The general policy for giving aid to institutions was first to investigate their needs and the existing conditions, giving them a small supply of the articles most fundamental in their operation, with the promise of more supplies later, provided that their institutions were in better condition when next visited by the American Red Cross. If, upon the occasion of the next visit, the use which had been made of the previous supplies and the conditions of the institution justified it, more supplies were given.

Under this policy the influence of a single American doctor reached a large number of institutions, and it was a pleasure to see the improvement which the institutions showed from time to time. The local doctors and other personnel in charge of the institutions welcomed such inspections and manifestations of interest by the Americans.

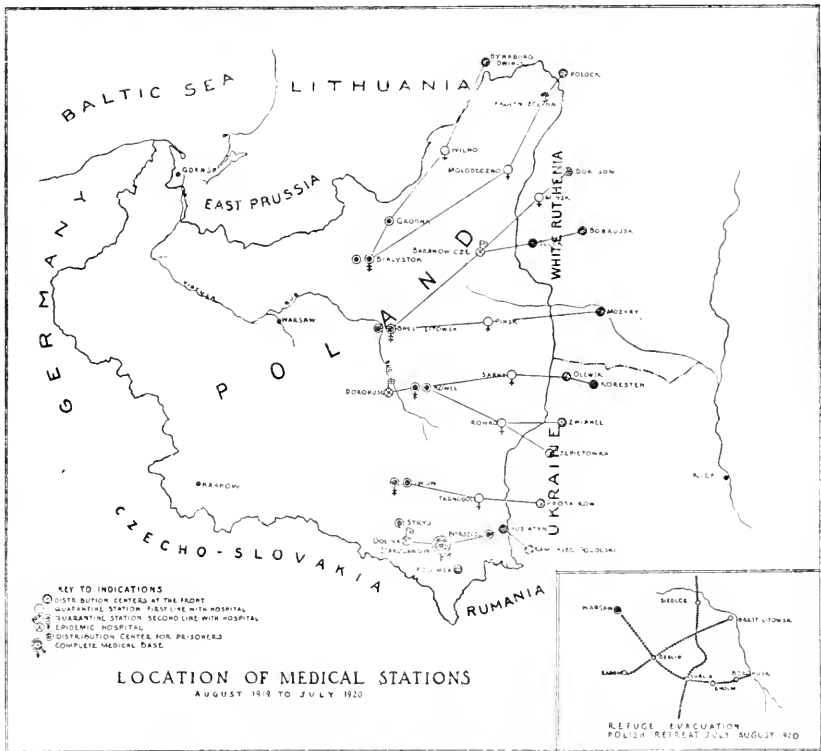
Civilian relief and social service work were done to some extent by American nurses and social service workers, but chiefly by Polish nurses' aides under the direction of an American nurse. In the various towns and communities these aides investigated conditions among the poor, instructing them as to the necessity and the ways of cleanliness. They also gave such material aid as seemed necessary and, in case of sickness, either sent the patient to a hospital or secured the patient medical attention in his home.

In addition to relief extended to institutions and individuals directly by the A. R. C., large amounts of supplies were turned over to the Polish Red Cross, Polish White Cross, Russian Red Cross, Ministry of Public Health, Refugee Commission, General Staff of the Army, and to the Surgeon General.

At headquarters in each of the districts and at unit stations, sewing clubs were furnished with material for making underclothes and shirts. Most of these clubs returned the finished product to the American Red Cross, but in some instances the distribution was made by the organization. It may be truly said that tons of yarn (there being at one time 600,000 pounds of yarn in the warehouse at Warsaw) were distributed to local organizations and individuals. Sewing rooms were established

where Polish women and girls were employed to make shirts, underwear, sheets and pillow-cases. They were paid in cash and given a noonday meal. These sewing rooms not only provided work for a large number of persons but offered them the opportunity to assist the needy population.

Institutions organized and operated by American personnel were: The Bacteriological Laboratory at Warsaw; the American Red Cross



MAP 1.

Surgical Hospital, and the Typhus Fever Hospital at Wilno; the A. R. C. Orphanage at Bialystok. (See Map 2.)

The Bacteriological Laboratory was located at the University of Warsaw and was directed by Dr. Placida G. Gardner. It functioned as a clinical and public health laboratory and prepared vaccines for the Army and Ministry of Public Health.

The American Red Cross Surgical Hospital at Wilno was to have been a gift to the Medical Department University at Wilno. Much delay was experienced owing to food supply for the hospital and a



suitable building. The food supply was finally guaranteed, and the building formerly used as the Russian Ensigns' College was secured.

Dr. F. W. Black, a former army surgeon, who saw service with the British, Italians and Americans, and who was awarded the D. S. C. by the American Government, was assigned the task of organizing the hospital.

It was a disheartening assignment; there was not a pane of glass in



MAP 2.

the building; nearly all the doors were gone; plumbing fixtures missing and the heating system completely out of order. In some of the halls snow was 2 feet deep. After several months' hard work the hospital was opened, thoroughly equipped with instruments, medicines and dressings; bare rooms had been converted into up-to-date operating rooms, dressing rooms, laboratory, and wards to accommodate 250 surgical cases. During the military activities which took place in the summer of 1920, the capacity was increased to 500.

The administration was under a medical officer detailed from the

army. Other medical officers were also detailed for surgical duties in the hospital. Dr. Black and his staff of American physicians and nurses acted as instructors in modern surgery, especially that which had been developed during the great war.

The Wilno Typhus Fever Hospital was established in the Wilno Railway Hospital, a group of modern buildings which had been planned and built under the direction of Dr. Maczewski, chief railway surgeon of Wilno. Full equipment for a 200-bed hospital was installed, and Lieut. Col. Fondham, of the League of Red Cross Societies, assigned in charge, with several American physicians and a corps of nurses. This hospital received patients from the railway employees and some typhus fever patients from the army.

The A. R. C. Orphanage at Bialystok was located in one of the Russian brick barracks at the local garrison. It had between 750 to 800 orphans. The children came from the eastern part of Poland and were in a pitiful condition on arrival. A large number had skin diseases, some cases of recurrent typhus, and all were suffering from malnutrition.

Classes were formed, trade shops equipped, and competent teachers and instructors employed to assume charge of the educational program for these children. The future seemed bright for these children and the other activities undertaken as constructive work by the A. R. C., but in time of war, plans are frequently and unexpectedly changed.

For the seven months ending May 1, 1920, reports showed the following relief work accomplished:

In the Northern District, 135 hospitals, with a total of 28,000 beds, had received medical and surgical supplies; 30 dispensaries, equipped, and supplied; 115 orphanages, with a total of 9,000 inmates, furnished with food, clothing, soap and medical supplies; 80,000 school children furnished with clothing and 93,000 adults and 42,000 children furnished relief by local organizations with supplies furnished by the A. R. C.

In the Southern District, supplies, medicines and surgical equipment was furnished to 138 hospitals with a total of 27,000 beds; 155 orphanages, with 14,000 inmates; 16,000 school children and 13,500 individuals supplied through local organizations working in cooperation with the A. R. C.

In the Warsaw District hospitals with a total of 20,000 beds were furnished with supplies; 15,000 orphans completely clothed, and 85,000 individuals furnished clothing and some food; 75,000 refugees and prisoners of war furnished soap, medicine and clothing.

During this entire period the important problem, "Typhus," had not been lost sight of. From the beginning it was evident to all that the problem of feeding and clothing was so closely allied with that of

medical relief and epidemiology that it seemed impracticable to attempt to separate them.

Colonel Dr. Kazimu Habicht, Medical Corps, General Staff, Polish Army, first submitted to the Ministry of Public Health a plan for the prevention of the spread of typhus fever. For many obvious reasons the program as outlined could not be carried out. It is now being carried out to some extent and is being enlarged as rapidly as supplies and personnel will allow. His plan slightly modified was as follows:

Although it is impossible to start the campaign against typhus fever immediately in all centers, it is, however, possible to prevent the spreading of the infection and the forming of new centers in the country by preventing people traveling by railroad from being infected.

Regulations with a view of preventing infection from spreading into the middle of Poland should be issued for travelers from the Eastern sections and should be executed with all severity. These regulations are necessary, not only because the infection can spread over the country but also because our western frontier could be closed by quarantine, which measure would cause enormous losses from the economical point of view as well as from the strategical.

These regulations will prevent the population from unnecessary traveling and will help to stop the spreading of the infection. There will certainly be some disadvantages, but one must ask sacrifices from the individual for the good of the commonwealth.

The travelers from the east will be divided into two categories:

1. Refugees who have to pass the quarantine.
2. Travelers from the eastern sections who have to be examined by physicians at certain stations and who, according to the opinion of the examining physician, will be held at the quarantine stations and will have to submit to disinfection of themselves as well as their personal effects. The sections behind the line of the Bug (east of the line Stanislawow-Lwow-Brzesc-Litowsk and Bialystok) are considered as typhus infected countries.

#### REGULATIONS FOR TRAVELERS IN GENERAL

The refugees passing the front will be permitted to go through by the military authorities, but only at the points of distribution mentioned below.

The line of these points should be elastic so that it could be advanced and withdrawn according to the advancing or retiring of the front line.

The points of distribution are: Dynaburg, Polock, Borysow, Bobrujsk, Mikaszowice, Olewsk, Szepietowka, Ploskirow, Kamieniec, Podolski, and possibly Husiatyn. Besides these points of distribution, located at the railroad lines, another should be arranged at Zwiahel, where many refugees coming back are expected on the road from Zytomierz.

If it is impossible to arrange in these localities barracks with hospitals, and also delousing stations, the refugees will be sent in cars to the quarantine stations. Refugees will be sent from these distribution points in special cars to the first quarantine line.

The following places will be considered quarantine stations: Wilno, Molodeczno, Minsk, Pinsk, Sarny, Rowno, Tarnapol and Stanislawow.

Refugees will be transported from the point of distribution to these quarantine places for the purpose of disinfecting both themselves and their luggage. Travelers from the front line to the interior will be compelled to be examined by physicians.

The physicians will determine whether the further journey will be allowed; whether the traveler should be deloused and disinfected; whether the traveler should be placed in hospital.

A second line for examination will be fixed for travelers to the interior of Poland. The refugees transported to the second line of examination should be disinfected again.

In addition to the above-mentioned stations some larger epidemic hospitals of reserve (depot) will be established at Baranowicze, Dorohusk, and Dolina, to enable the evacuation of the patients to the hospitals, in case the hospitals or the quarantine stations become overcrowded, or to transport and accommodate there the refugees in case of a larger unexpected transport.

It is not necessary to mention that the choice of a quarantine station has not been arbitrary, but that only places where hospitals, delousing stations, baths, etc., existed before have been chosen.

According to the development of the anti-typhus campaign, it will be necessary to enlarge these establishments, especially to increase the number of beds for patients and to perfect the disinfecting apparatus. When the fighting line will be fixed it will be necessary to develop and organize these distribution points on the fighting line so that they may become later quarantine stations.

It will be necessary to establish some more stations of this kind in other provinces, but it will depend upon the experience gained by the representative of the commissioners who are sent to these provinces.

The Chief Military Commandant will direct the military chiefs at the front to send under military control prisoners of war captured on the front through the quarantine stations where they will be bathed and deloused so that they will arrive at the distribution stations for prisoners entirely disinfected.

The distribution stations for prisoners are Grodno, Bialystok, Brzesc-Litowsk, Kowel, Lwow, and Stryj. (See map 1.)

All campaigns against typhus and communicable diseases will depend, of course, on the supply of fuel for all delousing stations and hospitals, on the supply of food for hospitals and quarantine stations which should be sufficient to keep the travelers passing through quarantine for at least three or four days. On the other hand, the realization of all regulations will depend on the physicians and functionaries who will be in charge of this work.

This campaign will depend on the possibility of cleaning the cars after each trip, these cars being the carriers of infection to the traveling public.

In order to carry out the campaign it is necessary to furnish and to guarantee henceforth:

1. Supply of fuel. Only coal being employable for the heating of the disinfecting apparatus, in order to obtain a high and steady heat.
2. Supply and accumulation of food for hospitals and line stations.
3. Supply of lime, petroleum, benzine and other disinfecting material.

4. Supply of linen, soap, and clothing for refugees.

5. Organization of establishments at railroad stations for disinfecting the cars with steam and hot lye.

6. To furnish guards who being assigned for sanitary service will do their duty in the front line and at the quarantine stations in order to enforce the orders which have been issued.

After the front line for refugees will be closed and the distribution points of the front itself and the quarantine in the middle of the country will be prepared, the cleaning and delousing of the population on the front will be taken up. Our soldiers live among this population, and, being in constant contact with these people, contract typhus and other communicable diseases.

It is necessary to impress upon the soldier the danger which threatens him when he is in contact with the local population. It is also necessary for the chief commandant and all the chiefs to see that these regulations are observed.

The military authorities will take upon themselves, as far as possible, the cleaning of the villages occupied by the detachments on the front.

In order to carry on the cleaning and delousing of the population behind the front, it is necessary to base this campaign against communicable diseases through an organization of sanitary service in the eastern sections, which organization already exists. There are physicians appointed by the towns, counties and villages and, in addition, villages have the services of surgical assistants. Hospitals have been established there. It is only necessary to support this, your organization, to enlarge the hospitals and to give them more supplies, especially to encourage the physicians to cooperate in the campaign against typhus. With good will and experience very much could be realized. Indeed there is no other communicable disease so easy to be stamped out as typhus is. We must have good will, good organization and comparatively strong government to carry on the anti-typhus campaign. Many measures against typhus may be improvised.

It is necessary to ask the civilian administration to propose a plan of organization for the sanitary service in the eastern sections, including the names of the county physicians, their addresses, the names of the physicians of the towns and the villages and of the surgical assistants. Also to give the names of places where hospitals are established, the number of beds, the names of the physicians and surgical assistants of the hospitals.

The enclosed questionnaire should be sent to those physicians and returned after having been completed.

The plan proposed has reference to the enlargement of hospitals, establishing of new hospitals, building and improvising of delousing stations, establishing orphanages, and sending out of sanitary units, the organization of which should begin now.

#### QUESTIONNAIRE

On account of the danger of typhus infections and the spreading of other communicable diseases, it is necessary to fill out immediately the following. It is requested that all answers be given fully which will help us in preparing a plan to expedite and to realize in the most efficient way a campaign against communicable diseases:

1. Name of county:                      Town:                      Village:
2. Name and title of physician:
3. Number of physicians in county:                      Town:
4. Number of inhabitants:
5. Number of children under 14 years:
6. Are there any hospitals?                      How many?                      Kind?                      General or Epidemic?                      How many beds?                      In what condition?
7. Does the hospital receive patients?                      Has it food?                      Has it fuel?                      Has it disinfecting apparatus?                      What kind?                      Are there any baths?                      What kind?
8. How many pharmacies?                      How supplied?
9. Is there any delousing establishment in county?                      Town?                      What condition?
10. Could it be put into condition and enlarged?                      At what cost?                      Personnel necessary to operate?                      Supplies needed?
11. Could it be improvised?                      At what cost?                      Help needed?
12. Are there public baths?                      What kind?                      In what condition?  
(If these are ritual baths (Mikwe) could they be used as public baths?)
13. Is it possible to get fuel?                      Wood?                      Sawing mill in neighborhood?                      How far away?                      How are roads?
14. Are there children's homes?                      In what condition?                      Who maintains them?                      Number of children?                      Permanent?                      Temporary?                      How fed?
15. Is there a home for aged people?                      For cripples?                      In what condition?                      How many beds?
16. What percentage of population is sick with typhus?                      What percentage have had typhus?                      Typhoid fever?                      Small-pox?                      Venereal diseases?                      Tuberculosis?                      Trachoma?                      Other diseases?
17. How many people vaccinated last year?                      How many should be vaccinated against small-pox?
18. Wealth of the inhabitants of the county?                      Town?                      Village?
19. Supply of population with clothes?                      Linen?
20. With food?                      What per centage is wanted until harvest?                      If the cultivation of vegetables in Spring is successful?
21. Supply of fuel?
22. Condition of dwellings?
23. Percentage of population without dwellings?                      How do they live?
24. Any building materials in country?                      Wood?                      Brick?                      Stone?                      Lime?
25. What kind of difficulty in getting building material?                      Lack of wood?                      Bad roads?                      Lack of tractive power?
26. Condition of live stock?
27. What has been ordered and accomplished against communicable diseases?
28. What plans are henceforth proposed?
29. What outside help would be considered as the most successful for overcoming communicable diseases?
30. What is the attitude of the population?                      Will it observe regulations without resistance?
31. Remarks:

In counties where there are towns with their own sanitary service it is necessary to omit all remarks in regard to the town itself, and to take into consideration only communities which do not belong to the town. Only in Questions 3, 4, 5, 6, 8, 9, 12, and 14 is it necessary to state the number in order to get a general idea.

The work done among the discharged soldiers of Haller's Army was the most important preventive measure accomplished. In March, 1920, Congress authorized the Secretary of War to use army transports for the transportation from Danzig to New York, of 12,000 discharged soldiers of Haller's Army, residents of America.

As a result of investigation of Dr. George M. Converse, U. S. Public Health Service, a twelve-day quarantine against typhus was established for all Haller Army men returning to America. Major Dunbar, Medical Corps, U. S. A., a member of Colonel Gilchrist's Typhus Relief Commission, was placed in charge of the quarantine and delousing of these men. Major Dunbar established his quarantine station at Grupa, a short distance from Danzig. The A. R. C. cooperated in this work by supplying clothing, towels, soap and disinfectants, toilet articles, tobacco and cigarettes to the men and personnel to assist Major Dunbar in his work. The value of Major Dunbar's work is apparent from the fact that no cases of typhus developed among these men. Surely a strong argument for quarantine at port of embarkation of immigrants.

The advance of the Polish and Ukranian armies on Kief was closely followed by the A. R. C., and as each town was taken relief was immediately sent in. Twenty-five cars, carrying medical and surgical supplies, food, clothing, soap and disinfectants, arrived in Kief a few days after the city was taken.

During the last two years Kief was in the hands of sixteen governments. The following is, approximately, the schedule of these various governments:

- |  |   |
|--|---|
| 1917   | 6. May, Germans and Hetman.                                       |
| 1. Feb. 26, to abdication of the Czar, Provisional Government formed by presidium of the Douma, with Price Lwow, chairman. | 7. November, Germans and Petlura, Rada. Germans evacuate Ukraina. |
| 2. May, Kerensky's Government.   | 1919  |
| 3. October, Bolsheviks take Petrograd under Krilenko, Rada and Ukranian Army under Petlura forming in Kiew.                | 8. January 5, Bolshevik.  |
|  | 9. August, Dennikin.  |
|  | 10. October 1-5, Bolsheviks for five days.                        |
|  | 11. October 6, Dennikins.   |
|  | 12. December 2, Bolsheviks.                                       |
| 1918   | 1920  |
| 4. February 9, Bolsheviks.   | 13. May, Poles and Petlura.                                       |
| 5. March, Germans and Petlura, Rada.   | 14. June 12, Bolsheviks.  |

The conditions in Kiew were probably the most critical that any American Red Cross Unit has ever had to contend with. Kiew, with a population of 560,000, was starving. On each change of government there naturally was a muddle of money exchange and an enormous loss of money and property by the office holder or laborer or property holder. During every change of government there was more or less looting. Such men as scientists, doctors, or their wives, wives of professors or former generals, teachers, artists, people of former high standing, came to our office and actually were beggars. Thousands of these people had sold their last because they were hungry.

The markets in Kiew displayed the true condition of affairs. There were five main markets. These were crowded for blocks from early morning until well into the evening. These markets reminded one of a state fair stand. All around the market samovars were steaming the whole day long, serving tea to those who cared to buy. Everywhere venders and peddlers had articles on display. Here one found every article imaginable, from furniture, clothing, all sorts of house and kitchen utensils, hardware, jewelry, etc., to hospital equipment, and even drugs which were sold openly on the market. A great many of these articles were mere loot that had been taken during the Bolshevik regime, and mostly from the intelligent class. Here and there was a peasant wagon loaded with grain, with two or three peasants auctioneering grain for clothing or for any bargain they could get.

The crowd was jammed with people of the intelligent class selling their last belongings, their prized family relics, because they were hungry. Many of these people would bring their goods and carry them on their arms with tears in their eyes, hoping that someone would come along and buy their goods so that they could buy a loaf of bread or something to take home to their families. Here and there a phonograph in some stand would play a broken record, or a peddler would sound on a piano that was for sale. Prized violins and paintings of former artists were on display. It is true that there was food in the district. The peasants were very rich, but the average citizen of Kiew had nothing more to sell.

On the 7th of June the rumor was passed around that Kiew might have to be evacuated. Trainloads of refugees and civilians were pouring out of Kiew on their way to Poland. The booming of the artillery was heard nearer every day. The Bolsos were advancing in enormous hordes. They had already crossed the Dnieper north and south of Kiew.

On the eve of June 8, Mr. Jodko, head of the Polish Red Cross in Kiew, notified the American Red Cross that he had received word from the Staff that the Polish Red Cross and the American Red Cross were



to leave Kiew. Gen. Ritz Smigley, of the Third Army, advised not to leave Kiew that night, as the road to Zytomierz was not safe and the railroad bridge to Koresten was destroyed. He said that Kiew might be completely surrounded and that we might have to stay until relief arrived from Warsaw.

About 11 a.m. on the morning of June 9 the bridges across the Dnieper were blown up by the Poles, all the Polish troops being then on the west bank of that river. The artillery battle had commenced. On the eve of June 9 the shelling of Kiew had begun, and incendiary fires broke out here and there.

Kiew was evacuated Thursday, June 10.

The two American Red Cross parties evacuated Kiew in different directions, and both had thrilling experiences. The train party was escorted by a large number of troops, who traveled parallel with the railroad, protecting it. This railway was one of the chief objectives of the Bolsheviks, and, as a consequence, it drew fire and was the focus of some genuine fighting. The train passed a spot where, the night before, a stiff battle had been fought, and all about the track were the bodies of dead Poles and Bolsheviks, as well as many wounded, who were taken on the train and cared for by the American Red Cross.

All through the first night of the retreat the flash of firing ahead blazed along the horizon, while back of us the sky was bright with the burning of Kiew, with other conflagrations showing to the north and south. We were headed for Zytomierz, but our real danger lay in the fact that none knew for a certainty what army was then occupying Zytomierz or would be in possession of it when we arrived. Friday afternoon the suspense slackened. Zytomierz was in Polish hands. The stay here was short. The enemy was just outside of the city and advancing rapidly.

The motor party, traveling with the army transport, moved out of Kiew in a column which comprised 253 cars, with four armored cars, fifty machine guns, and a small party of scouts. Throughout their journey there was continual alarm. Bridges were down, hurriedly wrecked, but in no case damaged beyond repair.

By Wednesday, June 16, all American Red Cross Workers of Kiew were safe in Warsaw.

The withdrawal of the Polish Army toward Warsaw continued, and on July 9 orders were received from the General Staff, Wilno District, for the evacuation of the A. R. C. Surgical and Typhus Fever Hospital. All patients, personnel and supplies were successfully transported to Warsaw.

On July 19 war news was so unfavorable that all supplies not in

actual use at the Bialystok Orphanage were packed and arrangements made for the transporting of orphans and supplies to points west of Warsaw.

The train, consisting of fifty-two cars, carrying orphans, personnel and equipment, left Bialystok the morning of July 22.

Over 300 cars of supplies were also shipped out of Bialystok to Warsaw. The units at Minsk and Brest evacuated their supplies to Warsaw, and those at Tarnopol, Stanislawaw and Lwaw were evacuated to Krakow.

By August 5 the situation had become so acute that the evacuation of supplies from Warsaw to Krakow was commenced. Seven hundred cars of supplies were transported to Krakow.

With the exception of two secretaries and four nurses, who were sent to Krakow and Posen, all female personnel were returned to Paris.

Daily conferences of Americans were held at the American Legation. On August 14 Mr. White informed us that August 18 was the date fixed by the Bolsheviks to enter Warsaw. 'Twas not a hopeful outlook. Radzymin, about 12 miles east of Warsaw on the main highway, had changed hands three times on August 14. Polish troops withdrew from the town on Saturday afternoon and entrenched 5 miles west of Radzymin. A heavy bombardment of the Bolshevik lines was kept up all night.

At 9 a.m. Sunday, August 15, the attack on Radzymin was started. The whole Bolshevik line opened fire, and their artillery and machine guns took a heavy toll. But this was evidently the Poles' final attack: By 10.15 a.m. the town was under Polish control. This was the turning point. Within two weeks the Bolsheviks had retreated beyond the River Bug.

During the summer of 1920, five baggage coaches were converted into mobile operating rooms and thoroughly equipped. Two American physicians and Polish orderlies were assigned to each car, the cars being attached to troop trains in the advance zone. During the period of active operations they rendered surgical and medical assistance to 10,000 cases.

Five mobile canteen cars were also equipped and operated along the lines of communication. Stationary canteens were operated at Bialystok, Minsk and Brest, until the last day these towns were occupied by the Poles. During 122 working days these canteens fed 700,000 persons.

An early winter in 1919 destroyed Poland's entire potato crop. The Bolshevik invasion of the summer of 1920 destroyed practically all the small grain crops. All towns through which these troop movements took place were again destitute of food, clothing and medical supplies.

In November, 1920, it was evident, from the destruction of property and loss of supplies resulting from the late military activities, that the suffering would be as great, if not greater, during the winter of 1920-21 as existed during the winter of 1919-20. To prevent as much distress as possible eight relief trains were sent out of Warsaw to points in the eastern section of the country, where losses had been the greatest. These trains continued to operate until all institutions which had suffered losses were equipped.

The majority of physicians who went to Poland left feeling that, in so far as sanitation and preventive medicine were concerned, they had accomplished very little. I have talked with physicians recently returned from Poland who assure me that many of the plans and recommendations made are now in force and are being extended as rapidly as means and circumstances will allow. Typhus, however, continues in epidemic form.

The inference should not be drawn that the Polish Government had made no effort to meet the economic conditions which came to them as an inheritance of the great war. Investigation, made early in February, 1920, before the arrival of any foreign relief organizations, showed that all food and clothing was under control of the Government; that soup kitchens for feeding the destitute adult population and milk stations for infants had been established in all the large cities. Hospitals and dispensaries, though poorly equipped, and handicapped by the lack of sufficient personnel, were operating on a free basis for the entire population. At Lodz, a city of 400,000 inhabitants, the municipal soup kitchen was feeding 70,000 adults daily, and supplying milk to 3,000 infants. The municipal soup kitchens and milk stations located in other sections were caring for their proportionate number of destitute people.

It was not lack of desire or ability to handle the situation that made it necessary for Poland to appeal for outside assistance; it was due entirely to the fact that their own supplies were very limited and no immediate means of relief in sight.

The story has not been half told. The part Poland has taken in the affairs of the world since the close of the Great War probably never will be written in full.



# A SURVEY OF CALCIUM HYPOCHLORITE (BLEACHING POWDER) TUBES FOR USE WITH THE LYSTER WATER BAG<sup>1</sup>

BY MAJOR CYRUS B. WOOD, B.S., M.D.

*Medical Corps, United States Army*

THE DISINFECTION of small quantities of water in the Lyster water bag by means of calcium hypochlorite (bleaching powder) was practiced to a considerable extent in the American Expeditionary Forces, and its use brought to attention, among other things, the unsatisfactory condition of the calcium hypochlorite tubes. As a result of improper packing and also, possibly, exceptionally rough handling in shipment, the breakage was considerable, amounting in the case of one lot of 12,000 tubes to 14 per cent. In addition, an unreasonably high percentage of defectively sealed tubes was found, notably in the case of one manufacturer.

In 1921 the Surgeon General accordingly directed that a survey of the stocks of calcium hypochlorite tubes on hand be made, and, through the cooperation of the Quartermaster General, samples of the tubes stored in depots in the eastern, southern, central and western states were sent to this laboratory for examination.

The survey resolved itself into two phases, (1) the physical examination of the tubes and their packing, and (2) the chemical examination of the contained calcium hypochlorite. These will be considered in turn, after which the results will be discussed.

The writer is indebted to Col. J. F. Siler, M. C., for access to the correspondence on this subject in the Surgeon General's Office.

## A. PHYSICAL EXAMINATION

The tubes were packed in cardboard boxes approximately 3½ by 6 by 2 inches (9 by 15.5 by 5 cm) in dimensions, each box labeled to contain sixty tubes; in only a few instances was this figure incorrect. Each box bore a printed label giving the name and address of the manufacturer and stating that each tube within contained approximately 1 gram or 15 grains of calcium hypochlorite or bleaching powder, that substance containing between 30 and 32 per cent free or available chlorine. In no case was any statement as to the date of manufacture

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<sup>1</sup> From the Division of Laboratories, Army Medical School.

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found; the labels bore no place for such information, nor was it added by rubber stamp or other mark.

The tubes were packed in the boxes in five layers of approximately twelve each. Each layer of tubes was placed upon a strip of corrugated paper, the tubes being fitted into the corrugations. As a rule, there was an extra strip of corrugated paper above the top layer of tubes; manufacturer III placed without exception three or four extra strips of corrugated paper above the top layer of tubes. A few boxes, of manufacturers I and II contained sawdust or the equivalent, but only one or two boxes were packed sufficiently tightly to prevent ready movement of the tubes within, on gentle shaking.

The tubes themselves were of amber glass about 1/25th of an inch (1 mm.) in thickness, and averaged about 5/16ths by 3 inches (8 by 70 to 80 mm.) in external dimensions. The different makes of tubes examined could be told from each other by the method used in sealing, and by the shape of the closed ends, as follows:

Manufacturer I—closed end flat; sealed end rounded.

Manufacturer II—closed end flat; sealed end drawn out to a long point.

Manufacturer III—both ends rounded.

Manufacturer IV—closed end flat; sealed end drawn out, short and stubby.

Each tube is supposed to bear a transverse file mark, to enable the user to break it with the unaided fingers. In only a few individual instances were these marks sufficiently deep, however, while in many instances the tubes bore mere scratches, carelessly made obliquely to the bore of the tube.

Each tube was handled individually, inspected closely, and classified as follows:

1. Broken—tube received broken; impossible to determine whether broken by contact with neighboring tubes, or exploded.

2. Exploded—tubes which exploded during the handling incident to inspection.

3. Cracked—tubes cracked in any place. The contents of most of these tubes were moist, but a few were dry, suggesting that the crack did not admit air.

4. Defectively sealed—tubes having in either end holes (not cracks) suggesting imperfect sealing.

5. Moist—apparently perfect tubes whose contents were moist.

6. Dry—apparently perfect tubes whose contents were sufficiently dry to be shaken from end to end by gentle tapping with finger or pencil.

The results of this examination are given in Table 1.

TABLE 1

		Defective tubes						Totals	Boxes
		Broken	Ex-ploded	Defec-tively sealed	Cracked	Con-tents moist	Good tubes contents dry		
Mfgr. I...	No..	242	25	63	269	129	2,870	3,598	60
	%	6.58	0.7	1.75	7.48	3.59	79.76	41.14	.....
Mfgr. II..	No..	224	13	56	307	260	3,517	4,377	73
	%	5.12	0.3	1.27	7.01	5.94	80.35	50.05	.....
Mfgr. III..	No..	109	0	32	118	7	444	710	12
	%	15.35	0	4.51	16.62	0.99	62.53	8.12	.....
Mfgr. IV...	No..	8	0	0	0	39	13	60	1
	%	13.33	0	0	0	65.0	21.67	0.69	.....
Totals..	No..	583	38	151	694	435	6,844	8,745	146
Average.	%	6.66	0.43	1.73	7.94	4.97	78.26	100.00	.....

Twenty-five dry tubes were opened and their contents found to weigh 21.64 grams, an average of 0.8656 gram per tube. Only three tubes contained more than 1 gram. The highest weight found was 1.12 grams, the lowest, 0.58. The question of the weight of the powder was not investigated further, since this is secondary to the available chlorine content.

#### B. CHEMICAL EXAMINATION

The available or free chlorine in the powder contained in the individual tubes was determined by dissolving the contents in water, adding aqueous potassium iodide solution, acidifying with hydrochloric acid and titrating the liberated iodine with a volumetric solution of sodium thiosulphate. Starch was not used as indicator.

The sodium thiosulphate used was checked with resublimed iodine and the concentration of the solution adjusted to 0.282 normal. Each cubic centimeter of this solution reacts with the iodine liberated by exactly 0.010 gram (10 milligrams) of chlorine, hence each cubic centimeter represents 1 per cent of available chlorine in 1 gram of bleaching powder. The following procedure was used:

A deep transverse file mark was made about the middle of the tube, the tube grasped in both hands, file mark down, thumbs together on top, fingers beneath, and broken by simultaneously exerting downward pressure with the thumbs and upward pressure with the fingers. The fingers were protected with a smooth cloth or paper, leaving the tube exposed at the file mark.

As a titration vessel a glass mortar about 10 cm. in diameter, over a white surface, was used; into it was first placed about 25 c.c. of distilled water, then the tube was broken over it, the contents emptied into it as well as possible, and the ends of the tube dropped in. Any powder on the covering of the hands was shaken into the mortar and the sides washed down with more distilled water. The fragments of the tube were then crushed with the pestle, which was used in the subsequent titration as a stirring rod, and the powder intimately mixed with the water. Five c.c. of a 70 per cent solution of potassium iodide were added, followed with 5 to 8 c.c. of 15 per cent hydrochloric acid. The color of the liberated iodine was discharged by the volumetric solution of sodium thiosulphate mentioned above, added from a burette; no difficulty was experienced in obtaining a sharp end point. After the color was discharged, 2 or 3 c.c. more of acid were added and any further color discharged with more thiosulphate solution; this occurred very few times.

Most of the tubes examined broke open with more or less of a sharp report, indicating increased pressure within. Tubes which exploded sufficiently violently to scatter their contents beyond the titration vessel were discarded. Four hundred and sixty-two individual tubes were examined according to this procedure, the results being shown in Table 2. A content of 1 gram of powder in each tube is assumed.

TABLE 2

	Average per cent free chlorine content in tubes classified as:			Good tubes (contents dry) classified according to per cent free chlorine			
	Defective		Good				
	Defectively sealed and cracked	Contents moist	Contents dry	Under 10%	10 to 15%	15 to 20%	Over 20%
Mfgr. I..	10.76	1.30	12.02	43.02	10.45	23.28	23.23
Mfgr. II..	6.79	1.87	18.29	23.20	17.70	20.50	38.60
Mfgr. III.	0.38	0.38	0.51	100.00	0.00	0.00	0.00
Mfgr. IV.	0.00	11.65	21.62	0.00	0.00	0.00	100.00
Averages.	7.21	2.55	14.516	36.49	13.48	20.31	29.71

Through the courtesy of Maj. H. J. Nichols, M. C., a few of the dry tubes were examined bacteriologically and found to possess ample germicidal power, in spite of the fact that all opened with sharp reports.

#### C. DISCUSSION OF RESULTS

(a) *Age and Deterioration.*—Information as to the age of the tubes received was, unfortunately, incomplete. As mentioned above, no

date of manufacture was available. In the case of 65 per cent of the tubes examined we have a known age in months, i.e., the time, in months, elapsing between receipt at the depot and the date of examination.

<i>Number of boxes</i>	<i>Number of tubes</i>	<i>Known age in months</i>
12	709	16
12	722	18
12	717	19
12	716	26
48	2,875	28
96	5,739	

The known age of these tubes averages just under twenty-four months. This figure is undoubtedly a conservative one, by a matter of weeks if not of months, representing the time elapsing between the date of manufacture and their receipt at the depot.

Referring to this figure, to the average free chlorine content of a dry tube (14.516 per cent) and to the stated free chlorine content at the time of manufacture (30 to 32 per cent), the monthly deterioration can be calculated at not greater than 0.7 per cent. This figure probably errs in being too great, firstly, because no allowance was made for the unknown interval of time between manufacture and receipt at depot, and secondly, because there is a reasonable probability that the bleaching powder used by the manufacturers was under the stated titer.

One lot of tubes was watched for the effect of age on deterioration. It deteriorated noticeably and quite uniformly, as shown by the following figures, the average of sixty individual titrations:

**Dry tubes:**

	<i>May, 1921</i>	<i>July, 1922</i>
Per cent under 10 per cent free Cl.....	0.	0.
Per cent 10 to 20 per cent free Cl.....	20.	20.
Per cent over 20 per cent free Cl.....	80.	80.
Average per cent free Cl.....	31.25	24.19
Deterioration in 14 months.....	7.06%	
Deterioration in 1 month.....	0.504%	

(b) *The Choice of Tubes.*—Thinking of the use of the Lyster bag in the field, the figures in the bottom line of Table 2 are of considerable interest. The Lyster bag, when full, holds 36 gallons or 136 liters of water. One tube of bleaching powder containing 136 milligrams of free chlorine (i.e., one gram of powder of 13.6 per cent titer) will furnish one part per million free chlorine. This quantity will suffice for the disinfection of any but the most turbid waters that will be encountered in field service, as shown by the experiments of Lyster and of Fairhall.



The man actually selecting the tubes for use will use one of three degrees of care in their choice. First, he will use any tube except those exploded or broken; second, he may further take the trouble to discard tubes with moist contents; third, he may in addition inspect the tubes closely enough to discard cracked and defectively sealed tubes. These three degrees of care in choice of the tubes are compared in the following table, the figures representing the chances, in terms of per cent, of choosing tubes of varying properties:

	Dry tube	Dry, over 10% free Cl	Dry, over 15% free Cl	Dry, over 20% free Cl
Discarding broken and exploded tubes.....	84.24	53.49	42.12	25.03
Discarding broken, exploded and moist tubes..	89.00	56.52	44.50	26.40
Discarding broken, exploded, moist, defectively sealed and cracked tubes.....	100.00	63.50	50.02	29.71

These figures show that a definite improvement in the quality of the tubes used is brought about by exercising care in the choice of the tubes.

(c) *The Influence of Storage Temperature.*—The following figures strongly suggest that deterioration is more rapid during storage at warmer temperatures pertaining in southern depots:

Per cent	Southern	Northern	Factor in favor of northern tubes
Of grand total of tubes. . . . .	41.02	58.98	....
Tubes broken.....	12.21	2.81	4.34
Tubes moist.....	9.29	1.96	4.74
Tubes dry.....	69.6	84.28	1.21
Dry tubes having less than 10% free chlorine.....	61.92	21.87	2.83

(d) *Surveys of Stocks.*—From a sanitary standpoint a knowledge of the quality of tubes used by troops in the field, depending upon the Lyster bag treatment for their drinking water, is important. Occasional surveys, it seems to the writer, are highly desirable. A survey should be made, at the latest, when the tubes are two years old, dated from the time of manufacture. After this time, surveys every six months should be made.

Stocks of tubes should be condemned when the average free chlorine content of dry tubes falls below 0.100 gram (10 per cent).

#### D. CONCLUSIONS

1. Improved methods of packing would decrease breakage.
2. Good tubes, with dry contents, two years old, will give to 36

gallons (a Lyster bag full) of water a little over 1 part per million free chlorine.

3. In perfect tubes calcium hypochlorite deteriorates at the rate of about 0.5 per cent monthly.

4. Deterioration is more rapid in warmer climates.

5. Surveys of stocks at regular intervals are desirable; intervals to be dated from the date of manufacture.

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# *The Military Surgeon*

*Published monthly and constituting two volumes annually.  
Volumes commence with the January and July numbers.*

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Entered as second-class matter January 22, 1916, in the Postoffice at Washington, D. C., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917; authorized July 2, 1918.

Subscriptions \$4.00 a year for the United States. Elsewhere throughout the world \$4.50. Single copies 50 cents. Subscriptions payable in advance. Checks should be made payable to The Association of Military Surgeons, U. S., and not to any officer personally.

*The addresses of members and subscribers are not changed except upon request.* In every case the old as well as the new address should be given. Requests for change of address must reach the Secretary before the twentieth of the month to be effective for the following issue.

Original articles, items of news and matter of interest to the Services are welcomed. Requests for reprints should be made at the time of forwarding articles.

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## THE ANNUAL MEETING

The Annual Meeting of the Association, as has been stated in previous issues of *THE MILITARY SURGEON*, will take place in the Auditorium of the New Interior Building on F Street, Northwest, between 18th and 19th, Washington, D. C., October 12-14, 1922, and it is hoped that there will be a full attendance at this meeting, as we anticipate an interesting program. Hotel rates have been published in the September issue and are reprinted herewith for the benefit of those who may not have considered them. Members are urged to come and make the meeting more successful by participation in the discussion of the papers. Owing to the full program, the length of time allowed to those reading papers will probably not exceed twenty minutes.

The following is the tentative program, which may be subject to some possible slight changes:

### TENTATIVE PROGRAM

OCTOBER 12

*Opening Meeting, 9.30 A.M.*

1. Opening of the meeting.
2. Addresses by:
  - Major Gen. Merritt W. Ireland, Surgeon General, U. S. Army.
  - Rear Admiral E. R. Stitt, Surgeon General, U. S. Navy.
  - Dr. Hugh S. Cumming, Surgeon General U. S. P. H. S.
3. Address of the President, Capt. Frank L. Pleadwell, M. C., U. S. Navy.

4. Reports of: Executive Council; Secretary-Treasurer; Committee on Arrangements; Literary Committee; Committee on Legislation; Boards of Award; Necrology Committee.
5. Appointment of: Nominating Committee; Auditing Committee; Committee on Resolutions.
6. Miscellaneous Business.

*Second Session, 2.00 P. M.*

## 1. Addresses:

- "The Relations of the U. S. Military and Public Health Service to Civil Practice," by Dr. A. W. Boswell, President, D. C. Medical Society.
- "Some Notes on the Management of the Common Complaints of the Ear, Nose, and Throat in the Troops in Active Service, with a Consideration of the Relationship which should exist between the Specialist and the Medical Officer," by Col. P. G. Goldsmith, C. A. M. C., C. B. E.
- "The Military Surgeon as a Specialist," by Capt. D. N. Carpenter, M. C., U. S. Navy.
- "Medical Aspects of Naval Gas Warfare," by Lieut. Gilbert H. Mankin, M. C., U. S. Navy.

*Third Session, 8.00 P. M.*

## Addresses:

- "The Brigade Surgeon with a Tropical Expeditionary Force," by Comdr. John J. Snyder, M. C., U. S. Navy.
- "Tularaemia," by Surgeon Edward Francis, U. S. P. H. S.
- "The Immunity Conferred by Smallpox Vaccination," by Surgeon J. P. Leake, U. S. P. H. S.
- "Preventive Medicine and Its Relation to Medical Military Problems," by Lt. Comdr. R. F. Jones, M. C., U. S. Navy.

OCTOBER 13

*Fourth Session, 9.30 A. M.*

## Addresses:

- "Some Salient Features of the Pharmacology of Arsphenamine with Reference to Its Clinical Usage," by Prof. Carl Voegtlin.
- "Neurosyphilis," by Lieut. Comdr. R. F. Sheehan, U. S. N., Ret.
- Labyrinthine Reactions in Syphilis, by Major Wm. F. Bonner, M.R.C., U. S. Army.
- "An Hypothesis for Public Health among Peoples Practically Aboriginal," by Lieut. Comdr. W. E. Eaton, M. C., U. S. Navy.
- "Aviation Problems in the Navy" by Lieut. Victor S. Armstrong, M. C., U. S. Navy.

*Fifth Session, 2.00 P. M.*

## Addresses:

- "The Importance of Correct Diagnosis," by Lieut. Comdr. John J. O'Malley, M. C., U. S. Navy.
- "Some Changes in the Duties and Activities of Naval Medical Officers Afloat," by Capt. Charles E. Riggs, M. C., U. S. Navy.
- "Naval Enlisted Personnel Selection," by Capt. C. N. Fiske, M. C., U. S. Navy.
- "The Fleet Surgeon; Some Thoughts on his Official Relationship and Opportunities for Useful Service" by Capt. W. H. Bell, M. C., U. S. Navy.

Paper by Lieut. Page O. Northington, M. C., U. S. Navy.

*Sixth Session, 8.00 P. M.*

## Addresses:

- "The Revolt of Medicine in the XVIth Century; An Historical Sketch," by Dr. Horace M. Brown.
- "A Plea for a Closer Relationship between Medicine and Pharmacy," by Comdr. R. C. Holcomb, M. C., U. S. Navy.
- Paper by Lieut. Col. William R. Davis, M. C., U. S. Army.
- Film and address by Comdr. Wm. Seaman Bainbridge, M. C., U. S. Navy.

OCTOBER 14

*Seventh Session, 9.30 A. M.*

(Will probably be held in the Amphitheatre at Walter Reed General Hospital. Transportation will probably be furnished.)

1. Report of Nominating Committee.
  2. Election of Officers.
  3. Addresses:
    - "Treatment of Chronic Empyema" (illustrated), by Col. Wm. L. Keller, M. C., U. S. Army.
    - "Broncho-Pneumonia with Special Reference to Incidence and Diagnosis," by Lieut. Comdr. W. A. Bloedorn, M. C., U. S. Navy.
  4. Installation of Officers and Reports of Committees.
  5. Unfinished business.
- Adjournment.

**HOTEL RATES FOR OCTOBER MEETING**

**THE ARLINGTON HOTEL, 1025 Vermont Avenue N.W.:**

Double rooms with twin beds and bath, \$6, \$7 and \$8 according to location, and suites of two rooms and bath accommodating four persons will be from \$10 per day up. European plan.

**THE BURLINGTON HOTEL:**

Single rooms with private bath, \$3.50, \$4.00 and \$4.50 per day; double rooms with private bath, \$6 and \$7 per day.

**THE CAIRO HOTEL, 1615 Q Street N.W.:**

Single room with bath, \$3 to \$4 per day; single room without bath, \$2.50 to \$3 per day; double room with bath, \$4 to \$6 per day; double room without bath, \$3.50 to \$4.00 per day.

**WARDMAN PARK HOTEL:**

Single room (one person) and bath, \$5 per day; double room, twin beds and bath, \$8.00 per day; parlor, double bedroom and bath, \$15.00 per day.

**THE LEE HOUSE:**

Single room, one occupant, \$4, \$5, \$6, and \$7 per day; double room, two occupants, \$6, \$7, \$8 and \$10 per day. All rooms have bath and shower and outside exposure.

**HOTEL LAFAYETTE:**

Single rooms, \$4 and \$5 per day; double rooms, \$6, \$7 and \$8 per day. European plan. All rooms have private bath.



## COMMENT AND CRITICISM

### RELATIVE TO PREPAREDNESS IN THE MEDICAL DEPARTMENT OF THE ARMY<sup>1</sup>

As part of a comprehensive study under the direction of the Assistant Secretary of War, the Medical Department of the Army is undertaking a study of the sources from which the supplies which it procures and uses can be had. The Medical Department is not only concerned with the provision of the personnel necessary to the treatment of the sick but is also charged with the supply of those things which are required by such personnel.

The armamentarium of modern medicine is exceedingly intricate, but without it the wonderful advances made in medicine are not available to the sick and injured, however skillful the personnel. The difficulties encountered in providing such elaborate equipment in time of war for the large number of new hospitals, infirmaries and first-aid stations necessary, and particularly in providing it at those institutions in the advance area, are manifest, and yet if the soldier is to be given the service that he is entitled to it must be provided.

In a war of any magnitude the burden thrown upon industry for the production of these supplies is enormous. Any information that could be made available beforehand to industry, as to type, number and quality, would obviously be of great advantage to industry in its plans. The Surgeon General is, therefore, side by side with his plans for the extension of the Officers' Reserve Corps, with his plans for instructing medical students through the R. O. T. C. in those duties of a medical officer which differ from those of the civilian physician, determining where the supplies needed by these officers may be had, should any grave emergency arise.

This effort is an attempt to do beforehand what was necessary after the declaration of war in the recent World War. It is done in recognition of the fact that the forces of the Medical Department, however numerous and skillful they may be, will be but half prepared without the necessary equipment. In brief, the program contemplates:

1. That a careful determination shall be made, not only of the items needed, but of the quantity thereof. With a close liaison established with industry, it is probable that often final decision as to the type of an article selected will be determined by the facilities of industry to produce it in large quantity.

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<sup>1</sup> Prepared in the Office of the Surgeon General of the Army, and published by his permission.—*The Editor.*

2. The plan contemplates also a roster of personnel skilled in the manufacture, inspection and purchasing of the various commodity groups. It is desired to secure, from industry itself, men who are eligible and will accept reserve corps commissions with a view to their assignment in time of emergency to the procurement of the commodity in which they are specialists. It is purposed that upon these men reliance will be placed in time of peace for advice and assistance in the study of industrial facilities and that in time of war they will be assigned to the centers of industry or to Washington for procurement duty.

3. The plan further contemplates that a thorough study be made of the facilities of the country to produce the essential and important items of the supply table and to have on file in the Office of the Surgeon General such reports as will enable the immediate placing of contracts in the event of any national emergency.

In this work the Surgeon General realizes that he must rely upon industry itself, and it is hoped to secure definite and complete information from the manufacturers as to aid they can render. It is probable that, in an emergency of any magnitude, Congress would again establish control of raw materials, labor, transportation and installations, and the Medical Department expects that, with the information to be obtained from the study on file, it will be in a position to render great assistance to the firms making medical supplies for the War Department. It can prevent the drafting of skilled labor, the taking of key men, it can assure the supply of material, of coal and of transportation, and thus obviate difficulties in the operation of the plant.

### UNDERGROUND HYGIENE AND SANITATION<sup>1</sup>

The terms "sanitation and hygiene" are often used interchangeably, but it is more usual to apply "sanitation" to the environment or surroundings, and "hygiene" to the individual. The subject, however, is so broad that only a few of the phases of sanitation will be discussed in this paper, while the various phases of hygiene will be deferred for later consideration. One of the best definitions of sanitation that I have heard was given by Dr. L. L. Lumsden, of the U. S. Public Health Service, who stated that "Sanitation is the common-sense application of the principles of cleanliness."

As stated above, this paper is limited, and only the following phases are considered: (1) Safe practices with drinking water; (2) safe methods of sewage disposal; (3) safe practices in ventilation.

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<sup>1</sup> Report of Subcommittee on Mine Hygiene and Sanitation, Mining Section, Bureau of Mines, Department of the Interior, National Safety Council. Detroit meeting, August 28 to September 1, 1922.



## DRINKING WATER

Pure drinking water may be defined as that which does not contain any substance injurious to the health. The purity of drinking water underground is dependent on its freedom from contamination (1) at its source, (2) during distribution, and (3) by the users.

*Contamination at Source and Purification.*—The most satisfactory drinking waters are clear, odorless, colorless, have no or very low mineral content, are well aerated, and are free from bacterial contamination. Turbidity is due to fine particles of solid matter suspended in the water. Kober<sup>2</sup> states that 50 parts of solids per 100,000, or 30 grams per gallon render the water unfit for drinking purposes, as such water is irritating to the gastro-intestinal tract. Some dissolved minerals, as the sulphates of sodium and magnesium, may cause the water to have a carthartic action; other minerals may be irritants, as acid waters; or poisonous, as those containing lead or zinc salts. Though unaerated water is not detrimental to the health, its taste is flat and, therefore, not so pleasant to drink.

Bacteria are probably the most frequent contamination of water detrimental to health. Water is often polluted with sewage, human excreta, animal waste, and household waste. Water containing bacteria indicating contamination with any of the above wastes should be purified before it is used for drinking purposes. Properly distilled water is ideal from a hygienic standpoint, but it is expensive to produce and its taste is flat. Thorough aeration improves the taste but adds to the cost and may add organic matter, including bacteria. Boiling renders water safe as far as bacteria, true toxins, and probably most substances of organic origin are concerned. However, the ill effects due to stable inorganic chemical matter, such as lead salts, are not eliminated by boiling. This method of purification may be used where the water is known to be infected or where its character is unknown. Boiled water should be stored in covered pails or stoppered bottles in such a manner as to avoid contamination. Small filters, such as household filters, have a very limited use. They remove turbidity by straining out the solid particles, but reliance should not be placed in them if the water is infected and if they are operated in the usual way. It is said<sup>3</sup> that even in the closest grained, unglazed porcelain the pores of the filter are larger than the bacteria. The bacteria do not get through on account of the tortuous passages, but if conditions are favorable bacteria may grow through the walls of the filter and some-

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<sup>2</sup> Kober and Hanson, *Diseases of Occupation and Vocational Hygiene*, 1916.

<sup>3</sup> Rosenau, *Preventive Medicine and Hygiene*, 1920, p. 895.

times thus contaminate even pure water passed through them. One of the most convenient methods of purifying water is by the use of chlorinated lime (bleaching powder). For treatment of water on a small scale a stock solution should be made by mixing a teaspoonful of fresh chlorinated lime with one quart of water. Use one teaspoonful of a stock solution to 10 gallons of the water to be treated—36 drops to 1 gallon—mix, and let stand at least 15 minutes before using. The stock solution should be kept in a well-stoppered bottle in a cool place.

The discussion of purification of large amounts of water, as for a community, has been omitted, since such treatment should have the supervision of competent sanitarians; it has been demonstrated many times that haphazard methods usually lead to disappointing results.

All drinking water supplies for underground use should be properly disinfected (chlorinated) unless they are obtained from a source that has been approved by the State Department of Health.

*Contamination During Distribution.*—The safest method of distributing drinking water is to pipe it from its source to convenient points for use underground. While this is the safest method, the use of containers, such as kegs, barrels, or tanks, is probably the most widely practiced method, and is satisfactory for many mines, but it requires constant attention to prevent contamination of the water. All containers should be carefully washed and sterilized at least once a week when the source of the water is known to be pure, and daily if the water is infected or its purity unknown. An easy and efficient way to sterilize these containers is to add one-fourth ounce of chlorinated lime to a 50-gallon container, or a proportionate amount for containers of other capacity; fill the container with water and allow the mixture to stand from four to six hours. All containers should be so constructed that they may be kept tightly closed, and so arranged that the water can be drawn only from a tap or drinking fountain, or both.

Another method practiced at many mines is for each underground worker to carry drinking water in an individual pail. This method may be commended in that usually only the one man drinks from the pail and thus the opportunity is lessened for the spread of disease. The principal objections to it are the difficulty in determining the purity of the various sources of water, and the lack of supervision in maintaining their purity; also the limited amount of water available to each man for his working shift. The objections to this system can be lessened by placing a drinking fountain and faucet on the surface near the entrance to the mine, and in the case of metal mines by placing a drinking fountain and faucet on each level where the water has been piped into the mine. In case the water is taken underground in con-

tainers, such as barrels, the containers should be equipped with a drinking fountain and faucet of approved type. The miners can then conveniently fill their pails at these faucets from a source whose purity can be determined and controlled by the mine management. It also gives the miner an opportunity to have a plentiful supply of water. However, to secure the best results, a sufficient number of containers must be available in order that they may be placed convenient to all working places.

When it is advisable or necessary to cool water with ice, it is safer to so construct the containers that the ice does not come in contact with the water being kept cool. Where this is impracticable and the ice is placed in the water, it should be clear natural ice, ice made from distilled water, or ice made from a source approved by the State Department of Health.

*Contamination by Users.*—The common drinking cup is known to be capable of the transmission of disease from one user to another, and should be abolished; drinking fountains or individual cups should be substituted. Drinking fountains are more practical but should be so designed that it is impossible for the mouth of the drinker to come in contact with the outlet. This can be best accomplished by having the jet of water projected at an angle to the vertical. A metal guard about the outlet is also advisable. Suitable drinking fountain heads may be procured from manufacturers, or made in the local machine shops. One so made was described by Mr. C. B. Yates, of the Homestake Mining Co., at the meeting of the Congress of the National Safety Council last year. Mr. Yates called attention to the fact that the Homestake Company had discontinued the use of bowls on the head of the drinking fountains as they soon became foul with dirt and tobacco. The waste water should fall freely from the jet into a drain pipe.

Where the water is carried underground by each miner in an individual pail, there is less danger of infecting the water, as usually only the one miner drinks from the pail; the pail system may be used in conjunction with the distribution of water by pipes or large containers, since it is practically an individual cup system.

#### SUMMARY OF SAFE PRACTICES WITH DRINKING WATER

1. Water for drinking should be obtained from a source known to be pure. To be assured that it is pure, it is advisable to have the water or the sources of water examined and approved by the State Department of Health.

2. Where the water is known to be infected or its purity is unknown, it may be made safe for drinking purposes by distillation, by boiling, or by chlorination.

3. Small filters of the household type are not usually satisfactory and their use is, therefore, not advised.

4. The piping of drinking water underground is the safest method of its distribution.

5. If containers, such as barrels or kegs, are used in taking water underground, they should be kept tightly closed with only a tap or drinking fountain head, or both, for withdrawing the water. Such containers should be washed thoroughly and disinfected at regular intervals, at least once each week.

6. Sanitary drinking fountains should be so designed that it is impossible for the mouth of the drinker to come in contact with the outlet. Those fountains which direct the jet of water at an angle with the vertical are usually most satisfactory.

7. Taking drinking water underground in individual pails usually has the disadvantage of the water being obtained from many sources often of unknown purity, but it has the advantage of decreasing the danger of transmission of disease through drinking water, as each miner generally drinks only from his own pail.

8. Where ice is used for cooling water, it should be made from distilled water or water from a source approved by the State Department of Health. In cooling the water the ice and water should not be in contact, in which case the purity of the ice is of less importance.

#### SEWAGE DISPOSAL

The disposal of sewage is an important item of underground sanitation. It can best be emphasized by reviewing some of the dangers from its improper disposal. Miners, who have been farmers, know that livestock kept in the same pasture for many years, especially if the pasture is small, do not thrive, particularly in warm moist climates. Nearly all animals have parasites in their intestinal tract. The eggs of these parasites are passed in the droppings, develop into young worms, and, in turn, reinfect the livestock. Young stock usually sicken more easily and sometimes die. These facts apply in a similar manner to man. If his hands, food, or drinking water becomes contaminated with human sewage, he is often infected, sickens, and sometimes dies as a result.

*Diseases Resulting from Improper Sewage Disposal.*—The diseases spread by unsafe methods of sewage disposal in mines are typhoid fever, cholera, amebic dysentery, hookworm, and other intestinal parasitic diseases. Hookworm disease (bunches, ground itch, miners' anemia), while usually limited to tropical and subtropical climates on the surface, is in some sections of the temperate zone a very serious

disease among miners. The first epidemic of miners' anemia (hookworm disease) was among workers driving the St. Gothard tunnel through the Alps Mountains in 1879. Since then hookworm disease has been found in coal mines in Hungary, Germany, France, England, and South Africa. In the United States, the disease occurs in coal mines of West Virginia, Alabama, North Carolina, and probably other states, and in gold mines of California and Nevada. For the disease to spread, conditions must be favorable to the development of the hookworm eggs and larva (young worms). Great numbers of the eggs are deposited in the intestines of an infected person and are passed out through the feces. If the feces are deposited in the soil of a mine where the temperature and moisture are favorable, the eggs soon hatch and within a week or two the larva are fully developed. If a person comes in contact with these young worms (larva), they may pierce the skin at any place, but usually between the toes or fingers, causing itch or bunches. After passing through the skin, they are carried to the lungs by way of the lymph and blood streams where they pierce the capillary walls and appear in the terminal air cells; they pass up the bronchi and trachea to the throat, are swallowed, and finally lodge in the intestines. The infection may also take place by eating or drinking contaminated food or water, but this occurrence is not so usual.

Obviously, the way to prevent diseases transmitted by sewage is to care properly for intestinal body waste by means that will prevent the contamination of food, drinking water, or people with these body wastes. On the surface, the modern water-carriage sewer systems, with proper disposal plants, are best, but the water-carriage systems are impracticable in most mines due to the high cost of installation and maintenance, as accidents frequently occur in the plumbing from blasting or moving ground.

*Underground Methods of Sewage Disposal.*—Underground toilets should be so designed as to prevent the spread of disease germs contained in human excreta. The receptacle for the feces should be such that their spread by any or all agents, as flies, mice, rats, water, is avoided. The toilets should be in a well-lighted location convenient to the workers, and their surroundings should be kept clean, the roof and walls being white-washed. They should not be allowed at any time to become a nuisance either as to cleanliness or location. Dr. W. C. Gorgas, former Surgeon General of the U. S. Army and Chief Sanitary Officer of the Isthmian Canal, recommended a small vault for mines on the Rand. He stated that he would use no water whatever, but emphasized the importance of fly-tight covers. Recently a mine superintendent, who was at one time a sanitary engineer, told me that

he intended installing a water-tight system in his mine with a disinfectant to make the contents sterile.

There are several disinfectants in use, each having its advantages and disadvantages. Lime is a very cheap disinfectant, and is cleanly and easy to handle. However, its disinfectant efficiency is low and it must be used liberally to be at all effective; all excreta must be covered completely at all times. Chlorinated lime, while effective for killing bacteria, must be used in sufficient amounts to allow for oxidation of organic matter. Furthermore, hookworm eggs are very resistant to the action of chlorate of lime. It has been shown that from 22 to 40 hours' exposure fails to kill them. The use of chlorate of lime is, therefore, not recommended where hookworm disease is known or likely to exist. Cresol or tricresol or other disinfectants of this group have been found satisfactory if used in the strength of one part solution to 19 parts of water. Caustic soda (sodium hydrate) in a 1 per cent solution destroys all bacteria, but a 3 per cent solution is required to destroy hookworm eggs. This chemical is an excellent deodorant and disinfectant but a mechanical agitator is necessary for its efficient action. In the use of any of the disinfectants where percentage strength is given, sufficient quantities should be used to provide for that percentage when the receptacle is full.

Water-tight cans as receptacles have been found to be satisfactory in many mines when properly cared for. These cans may be made of 18 gage galvanized iron reinforced at the top and bottom with 2-inch iron bands. The cans should be 16 inches high and 16 inches in diameter; the corners inside should be rounded and a removable cover provided. A removable handle, or two attached handles, have proved satisfactory. The New Jersey Zinc Company have designed an all-metal latrine with a removable seat of aluminum which has no seams or curves. When a clean can is brought into the mine to replace the used one, the removable handle and cover are taken from the clean can and placed on the used one which is then ready for transportation.

To prevent the access of flies, mice, rats, or other small animals to the contents of a toilet can, it may be placed in a box of special design with tight joints of sound lumber, not less than 1 inch thick and dressed on one side. It should be provided with a closely fitting lid, the seat to be covered with a self-falling hinged lid. A box for a single can should not be less than 20 inches wide, 22 inches long, and 16½ inches high—inside measurements.

Toilet cars are another type of sanitary toilets for underground use. These mine toilet cars should be made of about ¾ inch steel about 4 feet long, 2 feet wide, and 2½ feet deep. There should be no sharp

corners or projections inside the car, thus lessening the opportunity for excreta to adhere to the sides of the car. Such a car as described is usually provided with two seats.

Practical experience has shown that sewage disposal systems need regular attention if they are to remain sanitary and satisfactory. One man should be assigned to the duty, and the care of the toilets should be made at regular stated intervals. These intervals will vary from daily attention to once in several weeks, depending upon the type used, the disinfectant provided, and the number of miners served.

*Surface Sewage Disposal.*—The effect on underground sanitation of the proper facilities for sewage disposal on the surface should be borne in mind by all operators. The surface toilets should be placed in convenient, clean, well-lighted, comfortable surroundings. Water-carriage sewage systems are, of course, the most satisfactory. Mines having modern change houses should include sanitary toilets as part of their equipment. When toilets of the above type are so located, their regular use by the miner follows naturally. This lessens the amount of sewage underground and encourages regular habits that are important to the health of the miners.

#### SUMMARY OF SAFE METHODS OF SEWAGE DISPOSAL

1. Improper or careless methods of sewage disposal underground predispose to the spread of intestinal diseases, notably typhoid fever, dysentery, hookworm disease, and other parasitic infections.

2. Water-carriage systems for the disposal of sewage underground are impracticable in most mines.

3. Water-tight and animal-tight containers for toilets are advised.

4. It is advisable to use a disinfectant in all containers; caustic soda, cresol or tricresol, and similar disinfectants have proved satisfactory.

5. The toilets should be conveniently located, well-lighted, and the surroundings kept in a sanitary condition.

6. Mine toilet cars have been used in many mines and found satisfactory.

7. All systems of sewage disposal need constant attention if their operation is to be satisfactory. One man should be made responsible for their care, and such care should be given at regular, stated intervals.

8. Adequate, convenient, sanitary surface toilets should be provided at all mines.

#### VENTILATION

Pure dry air at sea level contains 20.14 per cent of oxygen, 78.9 per cent of nitrogen, 0.94 per cent argon, and 0.03 per cent of carbon dioxide. Mine air may vary from the above composition owing to depletion of

oxygen, increase in carbon dioxide, and to the presence of abnormal gases as methane, hydrogen sulphide, and carbon monoxide, and to the presence of various dusts, such as those coming from coal, ores, and rock.

*Effects of Non-poisonous Dusts.*—Of the non-poisonous dusts, silica or quartz dust is apparently the most harmful. It has been shown in many localities, where men work in mines in which the rock contains a high percentage of silica, and where dry working methods are used, that pneumoconiosis or miners' phthisis is prevalent. Men with miners' phthisis have been found to be very susceptible to tubercular infection. Lanza, Higgins, and Harrington in the United States and investigators in South Africa emphasize the use of water in drilling and in wetting down muck piles, etc., as well as the necessity for good ventilation.

*Effects of Poisonous Dusts.*—Some dusts are poisonous when they come in contact with the human body, as those from lead, mercury, zinc, and arsenic ores. The dusts from the more soluble ores are the most dangerous. As an example, men are frequently severely poisoned when mining carbonate or oxide ores of lead, while lead poisoning is rare among miners working exclusively with galena. Ventilation to remove the dust, wet methods of drilling and handling ore, and personal cleanliness are the chief factors in lessening the danger of such poisoning.

Physical examination at regular intervals, at least once a year, of miners working in such dusts, followed by proper precautions, has been shown to materially lessen the amount of pneumoconiosis and the possibility of the development and spread of tuberculosis.

Coal dust is chiefly dangerous due to the fact that it will explode under certain conditions. This subject is mentioned here in order to call attention to the fact that ventilation will not prevent such explosions.

*Effects of Oxygen Deficiency.*—The gas in air most important to man is oxygen. Man has adapted himself to the normal amount, about 21 per cent, and does best when the air contains about this proportion. Yet he is able to live and work, though not so well, when there is a less amount. If the air contains about 17 per cent of oxygen, a man at work will breathe a little faster and a little deeper—about the same as when he first goes from sea level to an elevation of 5,000 feet. When the amount of oxygen in the air has been decreased to 15 per cent, many men so exposed become dizzy, notice a buzzing in the ears and a rapid heart action, and frequently suffer from headache. Very few men escape these symptoms when the percentage of oxygen falls to 10 per cent. Under certain conditions consciousness may be retained



even with as low as  $3\frac{1}{2}$  per cent, according to Haldane.<sup>4</sup> However, under other conditions, consciousness may be lost at 9 per cent or above. The flame of a candle or Wolf lamp is extinguished when there is  $16\frac{1}{2}$  per cent of oxygen or less, and the flame of a carbide or acetylene lamp is extinguished when there is 13 per cent or less.

While, as stated above, a man does not usually lose consciousness until very much less than 13 per cent is present, no one should attempt to enter an atmosphere in mines which will not support an acetylene flame, unless protected by self-contained oxygen breathing apparatus.

*Effects of Carbon Dioxide.*—Carbon dioxide is a normal constituent of air in small percentages. In mines it is increased by the breathing of men and animals, the burning of miners' lamps, mine fires, blasting operations, and by the action of acid waters on carbonate mineral. This gas, which is an important constituent of black damp, has long been used as a measure of the impurity of air, but its importance as such has probably been overestimated. Though in itself not toxic, it sometimes occurs in mines in sufficient quantities to cause symptoms in man or even unconsciousness and death. The effect of breathing 0.5 per cent of carbon dioxide in air, according to Hill,<sup>5</sup> is a slight and unnoticeable increase in the ventilation of the lungs—no more so than moving about—and a little more carbon dioxide is produced in the muscles; 2 per cent increases the ventilation of the lungs about 50 per cent; 3 per cent about 100 per cent; 5 per cent about 300 per cent; while 10 per cent cannot be endured for more than a minute or so. The effects are headache, sweating, dimness of vision, and tremor.

The presence and amount of carbon dioxide in air may be determined by an indicator for this gas described in Bureau of Mines Technical Paper 238.<sup>6</sup>

*Effects of Nitrogen, Hydrogen, and Methane.*—Abnormal accumulations of nitrogen or the presence of hydrogen or methane (marsh gas, have no deleterious physiological effects upon the body other than their action as diluents of the oxygen, which they may dilute to such an extent as to cause symptoms of oxygen deficiency. Hydrogen and methane, if present in the air in proper mixtures, are explosive and disaster may result.

The safety lamp may be used to detect oxygen deficiency and the presence of methane. The Burrell gas detector is a portable apparatus which has been developed for the quantitative determination of this gas.

<sup>4</sup> Haldane, J. S., *Respiration*, Yale University Press, 1922.

<sup>5</sup> Hill, Leonard, *The Science of Ventilation and Open Air Treatment*, Privy Council, Medical Research Committee, Part II, London, 1920.

<sup>6</sup> Milligan, L. H., Crites, D. O., and Wilson, W. S., *Indicator for carbon dioxide and oxygen in air and flue gas*. Tech. Paper 238, Bureau of Mines, 1920.

*Effects of Hydrogen Sulphide and Sulphur Dioxide.*—Hydrogen sulphide (stink damp) and sulphur dioxide are usually products of decomposition of sulphide minerals. They may also be produced by the burning of black powder and some other explosives. They may cause irritation of the eyes and respiratory passages, but are occasionally present in mines in dangerous quantities. It should be remembered, however, that as little as 0.05 per cent of the hydrogen sulphide will sometimes cause death after long exposure and 0.2 per cent will result in death in a very few minutes.<sup>7</sup> When mixed with 7 times its volume of air, hydrogen sulphide is violently explosive. These gases may be detected by their respective characteristic odors.

*Effects of Carbon Monoxide.*—Carbon monoxide, sometimes called "white damp" or "sweet gas," is a product of slow or incomplete combustion of organic material. It is produced during mine fires, explosions of gases or coal dust, and blasting operations. When mixed with air in proportions varying from 15½ to 75 per cent, carbon monoxide will explode if ignited. This gas causes many deaths among miners and workers in the mineral industries. It is without odor, color, or taste, and its effects often go unnoticed by the victim until too late. The United States Bureau of Mines found that a canary bird collapsed in the presence of between 0.2 and 0.3 per cent of carbon monoxide, while the members of the exploring party experienced no symptoms of distress. The bird quickly revived when placed in better air. A chemical apparatus, developed as a result of studies made during the World War and known as a carbon monoxide detector,<sup>8</sup> has also been found by the Bureau of Mines to be a valuable supplement to the canary in the detection of carbon monoxide, as smaller percentages of the gas can be estimated by its use than by the effects of the gas on small animals. It should be remembered that animals without red blood are not affected by carbon monoxide, it having been shown many times that such animals can live in high concentrations without harmful results. Recently it was demonstrated at the Bureau of Mines experiment station at Pittsburgh that roaches could be kept for several days in an atmosphere of 60 per cent carbon monoxide and 20 per cent oxygen without lessening their activities.

The effects of the various percentages of the gases described above are for normal temperatures and humidities; high temperature and humidity accentuate the symptoms.

<sup>7</sup> Lehmann, K. B., quoted by Rudolf Kober in *Kompodium per praktischen Toxikologie zum Gebrauche für Ärzte, Studierende und Medizinalbeamte*, Stuttgart, 1912.

<sup>8</sup> Sayers, R. R., *Prevention of Illness among Miners, Reports of Investigations, Serial No. 2315 Bureau of Mines, Feb., 1922.*

*Effects of High Temperatures and Humidities.*—Even though the air be of normal composition, if the temperature and humidity are abnormally high the efficiency of the miner is materially decreased, and there is probably a deleterious effect upon the health, for experience shows that cases of heart disease and vasomotor instability stand hot atmospheres badly.

Sayers and Harrington in their studies have noted particularly the effect of air movement<sup>9</sup> and have found that, if the air temperature is above 75° F. and the relative humidity is high, the efficiency and comfort of a worker are increased materially by air movement. With a linear movement of 100 feet, a miner is comfortable and fairly efficient as long as the temperature is not above 85° F., wet bulb. The same is true when the temperature is between 85° and 90°, provided the air velocity is 200 to 300 linear feet per minute. With a temperature of 90 to 95° the air is very oppressive when still, but it is not especially so when it has a movement of 400 to 800 linear feet per minute.

Good ventilation has been shown many times to increase the efficiency of the miner working in such hot places. Many mining companies have installed and are installing ventilating systems to lower the temperature. One large mining company spent about \$70,000 in sinking a ventilating shaft and in purchasing ventilating equipment. They report that this installation pays for itself once every six months in savings and in the increased efficiency of the workmen. In recent studies it has been shown that the efficiency and comfort of the miner could be materially increased in high temperatures and humidities by the use of a small portable fan to obtain air movement. This method, however, should be used only in emergencies and as a temporary expediency, because the final solution of the problem is the permanent installation of a ventilating system which will replace hot humid air with cooler pure air, and thus prevent the abnormal accumulation of harmful gases.

It cannot be emphasized too strongly that efficiency, comfort, and good health are dependent to a large extent on pure air, and that ill effects or symptoms arising from variations in the composition of the air, caused either by the lowering of the oxygen or by the addition of gases, such as carbon monoxide, or carbon dioxide, are best treated as follows:

1. By getting the victim to pure fresh air in the quickest time possible.
2. By breathing pure oxygen, if available.

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<sup>9</sup> Unpublished report.

3. By using Schaefer method of artificial respiration when the victim has ceased to breathe or is breathing slowly, irregularly, and shallow.

4. By keeping the victim warm and at rest.

#### SUMMARY OF SAFE PRACTICES IN VENTILATION

1. Miners who work in mines in which the rock contains a high percentage of silica and use dry mining methods have been found to be prone to pneumoconiosis.

2. Miners' phthisis or pneumoconiosis has been found to predispose to tuberculosis.

3. Good ventilation, wet drilling, and wet mining methods materially lessen the amount of pneumoconiosis.

4. Physical examination at regular intervals, at least once a year, followed by proper precautions by those found to be affected with pneumoconiosis or tuberculosis, materially lessens their prevalence.

5. Some dusts, as those from the more soluble lead, zinc, or arsenic ores, may cause illness due to the toxic effects of the respective salts of these metals. The precautions mentioned in Paragraph 3 are applicable here.

6. Air low in oxygen causes deeper and more rapid breathing and in increase in heart rate. If sufficiently low, unconsciousness and even death may result.

7. The flame of a safety lamp may be used to detect air deficient in oxygen.

8. Increased percentages of carbon dioxide in air cause an increase in the depth and rate of respiration, headache, dimness of vision, and tremor.

9. Carbon dioxide may be detected and the amount present determined by a special portable apparatus developed for this purpose.

10. Nitrogen, hydrogen, and methane have no toxic effect upon the body but may act as diluents of oxygen and thus indirectly cause the effects of oxygen deficiency.

11. The flame of a safety lamp, or a Burrell detector, may be used to determine the presence of marsh gas.

12. Hydrogen sulphide and sulphur dioxide may occasionally occur in mines in sufficient quantities to be dangerous. In low concentrations they cause irritation of the eyes and respiratory organs.

13. The presence of hydrogen sulphide and sulphur dioxide may be detected by their respective characteristic odors.

14. Carbon monoxide (white damp) has caused the death of many miners.

15. The presence of carbon monoxide may be detected by its effect upon canary birds or by the use of a carbon monoxide detector.

16. Animals without red blood are not affected by carbon monoxide.

17. High temperatures and humidities decrease the efficiency of miners and probably have a deleterious effect upon their health.

18. Good ventilation will prevent the ill effects of all gases referred to in paragraphs 6-17, inclusive.

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## BOOK REVIEWS

1921 COLLECTED PAPERS OF THE MAYO CLINIC, Rochester, Minn. Octavo of 1,318 pages, 392 illustrations. Philadelphia and London: W. B. Saunders Company, 1922. Cloth, \$12 net.

The arrangement of this number is practically the same as that of former numbers. There are seventy-six contributors, while in the last year's volume, 1920, there were sixty; there are seventy-four fewer pages this year than last.

One of the great values of these volumes is that they emphasize end results rather than technique. (The principles of surgical technique are now generally well understood.) There is not so much an appearance of ringing the changes in writing of the surgery of the stomach, duodenum, gall-bladder, gall-ducts, thyroid gland, etc., as in earlier numbers. Now, there scarcely seems to be space enough for the things that are written. In the opinion of the writer the volumes of the "Collected Papers of the Mayo Clinic" are the most valuable publications which we have; they teach scientific progress and at the same time tell the truth about end results, or what good may be expected following surgical intervention in special instances. Among the papers of particular interest may be mentioned one on "Jejunal Ulcers," by Judd, another by Bumpus on "Roentgen Ray" and "Radium in the Diagnosis and Treatment of Carcinoma of the Prostate." The experiences are based on an observation, during the past three years, of 1,641 patients. In 260 of these, 15.84 per cent, the prostates were malignant; 146 of these malignant prostates were removed; no form of treatment was employed in 325 cases. The remaining 197 were treated by radium. These observations gave a most favorable opportunity to learn what benefits may be expected, either surgically or by radiation, as compared with "letting nature take its course." It would appear that the advantage is with surgery, although, of course, operation was done in selected cases; also, that better results are to be expected from radiation when there is a better knowledge of its uses. Another most important paper is that by Sistrunk on "The Results Obtained in 218 Operations in Cancer of the Breast." He reports: Patients without glandular involvement, 86—having 55, or 63.9 per cent, alive five to eight years after operation. Patients with glandular involvement, 132—25, or 18.9 per cent, alive five years after operation. The study of prognosis based upon glandular involvement allows one to determine which of the patients are likely to die within five years, and which will probably live five years. What good material for propaganda purposes, for the education of the profession and the public—early recognition and operation, 63.9 per cent recovery; later recognition, glandular involvement, reasonably operable cases—only 18.9 per cent recovery! The thyroid gland receives its usual attention. "Thyroxin," "Basal Metabolic Rate," "Calorigenic Action of Thyroxin," "Some Physiologic and Chemical Properties of Thyroxin"—all this by the physicians and scientists. These papers are followed by several on the Surgery of Toxic Goiters, Lesions of the Thyroid Gland, and Malignant Tumors of the Thyroid—a series of unusual papers dealing with the thyroid from an advanced standpoint, the greatest development of which has come from this Clinic.

One of the best pieces of knowledge furnished by this volume is that on "Preoperative Preparation of Patients with Obstructive Jaundice," by Dr. Waltman Walters, in which he shows by a liberal clinical comparative observation that the intravenous injection of calcium chloride is a life-saving measure, to be followed in the preoperative preparation of cholemic patients.

Among the many instructive papers may be mentioned one by Stokes on "The Treatment of Late Syphilis and of Syphilis in Mother and Child"; others by Hedblom on "The Diagnosis and Treatment of Tuberculous Empyema," "Open Pneumothorax"; "Relation

to Tumor of the Chest Wall," and the "Treatment of Pericarditis with Effusion." In this latter paper will be found more information than is available in any textbook. Dr. Lockwood writes a paper on "Subdiaphragmatic Abscess," a type of pathology with which every surgeon comes in contact, and which is often one of great anxiety. The doctor states that the operation generally practiced has been either trans-pleural with resection of the eighth, ninth, and tenth ribs, or the surgeon has approached the abscess by an abdominal incision. He says that the extra-peritoneal abscesses and both intra-peritoneal abscesses can be best dealt with through a lateral thoracic incision. A study of the technique which he employs, and which is well illustrated, is worth while.

The paper on "Sarcoma of the Long Bones," by Meyerding, is a fine contribution; it is insisted upon that "A diagnosis should be made only after thorough clinical, physical, and roentgenographic examinations have been made, and even then cannot always be determined until an exploratory operation and microscopic examination rules out giant-cell tumor, chondroma, fibrocystic or cystic disease, syphilis and osteomyelitis. With early diagnosis, eradication of the tumor with care to exclude metastasis, prolongation of life may be looked for following operation, and by the use of radium, Roentgen ray, and Coley's toxins." Sistrunk reports four cases in which he bases a technique for the surgical removal of pancreatic stones. MacCartny presents two interesting studies of "Factors which Influence Longevity in Cancer," based in one study upon 293 cases and in the other 194 cases. He calls attention to the well-known fact that in some extensive cases patients live much longer post-operatively than others with easily removable small growths. This he concludes is due to the fact that in each instance, in the growths may be observed lymphocystic infiltration, fibrosis, hyalinization, and cellular differentiation. All these together form a natural defensive mechanism against cancer after it has once developed. This study would appear to be of great value in the making of a prognosis, and the presence or absence of such findings should be emphasized in every post-operative pathological report.

The volume is one of the most valuable that has been published. Among the seventy-six contributors there is none whose paper is not worth while. The volume is concluded by several addresses, the most interesting of which is by Wm. J. Mayo, entitled "In the Time of Henry Jacob Bigelow," presented before the Boston Surgical Association at the Medalist meeting, June, 1921. It is a pity, but true, that the physicians and surgeons of today, taken as a class, know very little about those who have made present knowledge possible to them. They seem to deal, to live, move, and have their being in the present, without knowledge or appreciation of their indebtedness to those who have preceded. The writer happened, in his early student days, to travel abroad on the same ship which carried two Boston physicians associated with the Massachusetts General Hospital. One of these gentlemen was the bearer of a complete outfit of Bigelow's instruments for the crushing of stone in the bladder and removal of the fragments. These instruments were to be presented to Billroth with Bigelow's compliments. Afterwards the writer had the opportunity of seeing them used for the first time by Billroth in his Clinic and hearing this great surgeon express his high appreciation of Bigelow personally, and the great worth of his instruments.

JOHN E. SUMMERS, M.D.



## Obituary

Those of our membership whose deaths have been noted since our last report are as follows:

**Dr. Hamilton F. Biggar, Jr.**

**Capt. Enos M. Hoover, M. R. C., U. S. Army**

**1st Lieut. Moses C. Hughey, M. C., U. S. Army**

**1st Lieut. W. T. Learned, M. C., M. V. M.**

**Major Stephen W. Perry, M. R. C., U. S. Army**

**Capt. Conrad W. Wilkowske, M. R. C., U. S. Army**





# THE MILITARY SURGEON

VOL. LI

NOVEMBER, 1922

NUMBER 5

## “A PLAN FOR THE CORRELATION OF THE THREE FEDERAL MEDICAL SERVICES IN PREPARATION FOR WAR, DURING THE CONTINUANCE OF HOSTILITIES, AND THROUGH THE SUBSEQUENT PERIOD OF RECONSTRUCTION”

BY MAJOR MAHLON ASHFORD

*Medical Corps, United States Army*

THE WELLCOME FIRST PRIZE ESSAY, 1922

### REASONS FOR A PLAN

HOWEVER excellent a plan may be, its consideration by intelligent persons cannot be expected unless the project is clearly for the advancement of the interests concerned. If a plan for the correlation of the three Federal Medical Services is supererogatory, the subject can only have such value as resides in a purely academic study. Less than a decade has passed since such an opinion may have been reasonably entertained. Conditions have, however, changed rapidly and definitely during this brief period. Just as the army officer has laid away the gold mounted blue of 1916 as the symbol of a past age, so must the officers of all three services banish from their minds conceptions of the insularity of their respective services which were current so short a time since. As the reader follows this study he will encounter cogent reasons for a plan for correlating the services.

If no other influence be considered than the development of the Reserve System, the necessity for such a plan may be shown to be of urgent importance. In addition to the manifest advantages of a coordinate relationship in the logical extension of the Reserve System in peace time, we cannot blind ourselves to the present intent of the Government to coordinate and consolidate its activities for the purpose of establishing a more efficient and less costly operation of its executive functions. The present political administration has already made epochal studies in this direction and is disposed to take far more radical measures to eliminate the duplication and reduplication of government

activities. The union of the distinct Departments of War and Navy has been seriously sought in this effort to lighten the taxpayer's burden. In addition to the saving of expenditures, the advocates of this and similar consolidation advance the opinion that a far more valuable organization will be developed not only for peace but during any future period of war, by the unified direction of all military and naval activities. These conceptions are only cited here to establish the tendency of this government towards unification of related activities. An example of correlation of the enterprises of two distinct Executive Departments which is more closely analogous to the plan under consideration is the Joint Board of the Army and Navy for the Production and Distribution of Munitions in time of war. This board is actually established and corresponds precisely in purpose and field with the boards which I am about to propose.

The parties in interest to any Plan for the Correlation of the Federal Medical Services are, broadly speaking, the American people, the three individual services affected, and the commissioned personnel which renders the actual service. Beyond question the interest of all three parties will be advanced by an equitable corelationship. The American people will get better service at less cost. The three services will avoid destructive and harmful competition and, by voluntary assumption of efficient relationship under conditions of unimpaired sovereignty, forestall forcible consolidation with inevitable loss of power of a dependent action. The personnel will derive the signal advantages of larger opportunity and greater stability in an age when legislation has proven far less conservative to the interests of individuals in public service than formerly obtained.

This last idea may require brief elucidation. A few years past the policy in this republic was to build up a navy fit to cope with any possible foe. The big-navy advocates confidently asserted that a powerful navy would be a Wall of China which no foe could quickly surmount. With the big navy men, therefore, the first corollary to the proposition was a little army. The reasoning was simple. The Navy would destroy the advancing foe or at least hold him off for the twenty-four-hour period required by the American imagination to organize and equip an unconquerable army. The prospects became black for the Army as the sun of public favor shone upon the Navy. This is not ancient history, for it is a matter of record that leaders of the present administration advocated this general principle within a year. Six months ago the Disarmament Conference submarined the big-navy idea. If this tendency continues, officers of the public service must eschew public service as a life work, unless, as is more than likely, the

need of trained commissioned personnel shall rise in one service as it falls in a sister service. One more example will complete the triangle. During the World War the Medical Department of the Army required the services of between 20,000 and 30,000 medical officers, many of whom lost interest or connection with prior occupation during their period of public service. Immediately after the war the Army was rapidly demobilized and no longer required the services of the vast majority of these temporary officers. Coincidentally the Public Health Service was clothed by law with the responsibility of caring for many thousands of wounded and disabled men. In carrying this tremendous burden the services of these former army medical officers have proven invaluable.

In view of these several considerations it is wholly reasonable to admit that a project for the correlation of the Federal Medical Services is worthy of serious thought and constructive study in the common interest of the American people, the services and the medical officers of the Army, Navy and Public Health Service.

Before entering upon the details of the plan advocated in this study, I shall devote a paragraph to a solution which has at various times been proposed by publicist, politician and even the profession. I refer to an Executive Department of Public Health under the direction of a cabinet officer charged with all affairs relating to public health and the medical profession in its broadest terms. I do not seriously consider this idea in formulating the present plan because, in the first place, it does not appear to meet the terms of the study; in the second place, I do not believe the American people are as yet prepared to welcome federal paternalism in this field; and finally because unification of all public services under one head, if ever accomplished, would not invalidate the plan of cooperation of the three major public services now operating independently under their several departments.

#### RESUME OF EXISTING SYSTEMS

Correlation of the three federal medical services in preparation for war must be based upon existing laws and regulations governing the concerned agencies or must be contingent upon revision of these controlling provisions by addition or amendment, in order to ensure the successful operation of the selected system. A brief survey of the present independent organizations is necessary in order to consider the simplest method of combining the essential features of each in an interdependent union.

The Army has at this moment perhaps the more complete and at the same time complex reserve organization of the three elements to be

considered. This is due in part to the attention which this executive branch has recently received from Congress and in part to the tremendous stimulus which the World War imparted to this subject of war preparedness upon a grand scale. The Medical Department of the Army has, as a result of these influences, no less than seven reserve bodies or corps. These are the Medical, Dental, Veterinary, Medical Administrative, Sanitary, Nurse, and Enlisted Reserves. While the development of each presents its particular phases, the governing principles are the same in each corps, so that the survey of one will serve for all.

The salient features of the Medical Reserve Corps System of the Army may be epitomized somewhat as follows. In the first place an Army Medical Service for a war organization requiring a maximum national effort is visualized. Viewing this tremendous national requirement, tables are studiously evolved to solve this mighty problem so that a paper table of organization is constructed. For each regiment, division, corps and field army the requirement of doctors for every imaginable need is determined, and this does not at all refer solely to numbers. Of necessity it must embrace a painstaking consideration of the special functions to be performed by each of these medical men. This entails a study of the requirement of each special group of practitioners and, in each group, subdivisions according to the class or degree of accomplishment. Thus, for example, we will assume that a division medical service will require the services of one or more doctors who can function as all-round nose and throat men for such duties as might be expected in a city dispensary. Doctors who are fully qualified for this duty may lack the operative ability required in the same specialty at the surgical hospital, and again the requirements of the surgical unit may fall short of the wider consultant experience or special technical requirement of the general hospital. Tables having thus been created to cover all conceivable requirements, the Army Medical Service endeavors to place in each niche the name of an enrolled officer of its reserve forces who is known by his record, qualification and professional standing to be approximately at least suitable to the office for which selected.

Even at first glance this system is admittedly difficult of accomplishment, but only those who struggle daily with the ever-changing factor of the human element can fully appreciate just how difficult it actually is. Of course the most discouraging feature of the whole endeavor is the instability of the reserve. There is constant ebb and flow of the reserve personnel. Jones comes in today, as Smith goes out. Brown gives up general practice for diseases of the stomach,

and Major Williams, who has been comfortably niched for three years as an operating surgeon, qualifies for a lieutenant colonel's commission and must be reassigned.

There are no doubt certain fundamental reasons why the Army Medical Department has undertaken this Sisyphean task, as there are unquestionably certain discoveries which lend hope to a belief in a reasonably successful issue. Of the various reasons for the project, none are better than these two. In the first place, it is a logical and intelligent method. In the second place, it promises to meet the most bitterly denounced shortcoming of former unpreparedness, namely, the misplacement of highly valuable professional and technical skill. The hope of the personnel experts of the Army lies in the decentralization of the details of assignment and in the stabilization of the reserve through intelligent appreciation of its efforts by the leaders of the civil profession. The decentralization is in part solved in the Army by the broad division of all units required in its Table of Organization into two grand divisions known as the B. A. or Branch Assignment and the T. A. or Territorial Assignment Group. All units of the latter group are farmed out to the nine geographical areas in the Continental United States and three overseas departments to be filled through the efforts of its personnel representatives in each area or department. These officers in turn farm out to the divisional officers of reserve divisions in their areas the function of selecting the reserve officers for their units. In the Branch Assignment Group the burden is still tremendous in the Medical Department, owing to the infinite number and variety of units which must be formed. Help, however, is derived even here through a process of decentralization since the great hospital units are being actually formed by the great universities and hospitals of the country from personnel of their own selection.

In order that the reader may visualize the extent of the present effort I will cite the fact that the Surgeon General of the Army is now undertaking the organization of the following units pursuant to the instructions of the Secretary of War:

3 Army Medical Headquarters.	37 Hospital Trains.
1 General Medical Headquarters.	3 Air Service Physical Examining Units.
2 Section Medical Headquarters.	5 General Dispensaries.
1 Specialist Group.	3 Army Medical Laboratories.
36 Surgical Hospitals.	12 Hospital Center Laboratories.
45 Evacuation Hospitals.	2 Communication Zone Medical Laboratories.
165 General Hospitals.	1 General Medical Laboratory.
24 Station Hospitals.	9 Medical Supply Depots.
3 Convalescent Hospitals.	2 Intermediate Medical Supply Depots.
12 Hospital Center Headquarters.	2 Base Medical Supply Depots.
12 Convalescent Camps.	

The general scheme just described has of necessity certain adjuncts and corollaries, and of these the chief interest lies in the method of procurement and training of personnel. For the immediate moment the source of personnel rests, of course, chiefly in the reenrollment of medical men who participated in the World War. For future purposes, the R. O. T. C. Units in leading medical schools of the country are regarded as the natural source of personnel. These units are in themselves also important training units and, when correlated with the C. M. T. C., constitute the notable features of the training of reserve officers.

While the reserve constitutes the largest component of the national defense system of the Army, there are two other units of equal importance. Of these the National Guard functions under much the same decentralized organization as has been described in the T. A. Group of Reserve Units. The third component, the Regular Army, is capable of rapid expansion and decentralization, although in its present attenuated form it may be fitly termed a skeleton organization.

The Navy and Public Health Service are engaged in the organization of units similar in principle to those just mentioned, although in detail modified to meet their individual needs. After the armistice, the Navy Reserve organization gradually passed into a stage of simple enrollment of reserve personnel owing to lack of funds for more extensive projects. Full appreciation of the necessity of an organized and classified reserve has recently led the Navy to take steps towards the development of an organization of classified personnel and enrolled hospital units similar in principle to that now being built by the Army. In some respects the demands upon the Public Health Service in the development of its reserve appear to be relatively less complex than those facing the wholly military branches. This service does not have to plan an organization of its personnel to fit into the requirements of line organizations, nor does it need to prepare for certain contingencies wholly pertaining to purely military service in war. On the other hand, war, and especially the aftermath of war, throws a sudden and tremendous burden on this service, and its personnel must be ready for the thunderclap of epidemic when no cloud of human warfare obscures the horizon.

Each of these services has therefore its problems, and the exigencies of the three may be simultaneous. The problem, then, is to effect an harmonious adjustment so that each will be prepared and so that the complete organization of one will not infringe upon or interfere with the working of the others.

DEFECTS IN EXISTING SYSTEM OF INDEPENDENT ACTIVITY

It is at once apparent that, under the present status of these Medical Departments of three distinct bureaus, there is of necessity a certain degree of overlapping, of waste effort or, rather, duplication of effort, of lack of team work—in short, inefficiency. Thus, for example, it is exceedingly probable that two services such as the Army and Navy may independently undertake to establish R. O. T. C. Units in the same university. Aside from the confusion and embarrassment to the civil institution, the cut-throat rivalry and other difficult features, there results a loss of money to the Government, which is employing two men to do ineffectually the work which one can easily perform effectively and fairly to each service. Again the same situation is faced in the organization of hospital units. Let us assume that the Army first approaches an important hospital center such as the Johns Hopkins University Hospital with the proposition that this hospital organize from its staff a General Hospital Unit, an Evacuation Hospital Unit and two Surgical Hospitals. The authorities of the university undertake to meet the proposal of the Government and begin the desired organization. Scarcely has the work begun, when along comes the Navy, and at its heels the Public Health Service, with similar requests for similar units and no doubt desirous of the identical personnel which is sought by the two competing services. The result is annoying to the university and discreditable to the Executive Departments of the Government. It is natural to assume that hospitals and universities no less than the individual leaders of the civil profession will say: "Why do not the government services get together and pool their needs and resources for the common good?" That this can be done simply and effectively I now propose to establish.

THE MACHINERY OF THE PLAN

He who undertakes to devise a plan such as this study requires finds himself sailing in the classical seas of Scylla and Charybdis. If infinite detail is devised, he will be termed a vain builder of dreams. If broad foundations are sketched, the practicability of the superstructure is doubted by those who lack imaginative powers. If therefore this simple plan seems chimerical or incomplete, I ask the indulgence which generous minds accord the sincere effort of those who strive to construct an edifice in the shadowy land of the future.

The formation of a voluntary association of independent bodies necessitates a central organization or committee whose membership shall represent the interests of the several members. In this instance two distinct boards are proposed. Let us call the superior board "The

Joint Board of the Federal Medical Services," and the lesser one, "The Board of Operations of the Federal Medical Services."

The senior board will determine major questions of policy or action which may proceed from any source, though customarily from the Board of Operations. Thus it will decide matters referred to it by the Board of Operations in matters of important policy, matters recommended for consideration by the inferior board but requiring legislative or higher executive action, and matters in which a satisfactory and harmonious conclusion cannot be reached by the Operations Board. Its membership will consist of the chiefs of the Medical Departments of the three services. It will have stated meetings for the transaction of routine business and discussion of matters of common concern to the three departments. Special meetings will be called by the president at the request of any member. The presiding officer will hold office for one year. He will have the same privileges of voting and discussion as the two other members and in other respects will have the usual responsibilities and rights accorded by parliamentary custom to his office. The chief of each department will in turn hold office, with one proviso, to be cited hereafter. The outgoing president of each board and section will maintain and certify to the records of board proceedings for the period of one year. The vote of two members will determine the policy or action of the board with this proviso that no majority vote will be binding upon the third member if at variance with the policy or instructions governing this member in his own Executive Department. In a general way this board will concern itself with important affairs of the three services in their relations with each other, with the Executive Departments, and with matters of public service in which they have joint or mutual interest. It will not be concerned with matters of detail of action or details of operation. In so far as the problems of its three departments are involved, the Superior Board will have, in time of public emergency, analogous functions to a special committee of a Council of National Defense. The Superior Board may increase the number of sections of the Board of Operations either permanently or temporarily during time of public emergency. This imparts to the organization an elasticity which enables the governing board to expand the Operations Board in accordance with its responsibilities and the developments of circumstance and experience.

The Board of Operations will consist of not less than five sections to each of which the chief of each Medical Department will nominate a representative. These sections will be the following:

1. Personnel.
2. Supply.



3. Hospitalization.
4. Organization and Equipment.
5. Preventative Medicine, Sanitation and Epidemiology.

The Board of Operations is the practical working body of the joint association. It will meet in full session at stated intervals determined by its membership, and at special session upon instruction from the Superior Board or request of any two of its own sections. The two boards may be compared to a General Staff organization in which the Superior Board corresponds to the immediate advisers of the Chief of Staff, and the Inferior Board to the several sections concerned with the special problems requiring committee study, investigation and action.

The several sections of the Operations Board may meet independently for the transaction of business of direct or special interest and importance to the section concerned, but no one section can alone determine upon a policy which concerns any of the other sections or is of moment to the Superior Board. Such matters of general moment must be presented to the full board. In order that this requirement may be maintained without interfering with the principle of committee action, the recorder of each section must present to each stated or special meeting of the full Board of Operations a brief but formal statement or record of the matters disposed by his section at all meetings since the full board last convened. The office of presiding officer of the Superior Board, the Board of Operations and the sections of the latter board will be held in rotation for the period of one year by a representative of the three associated services, but it will be provided that no department shall have at the same period a presiding officer of any two of these three bodies. Thus in the year 1924, if the presiding officer of the Superior Board is of the Navy, the Army representative may preside for the Board of Operations and the Public Health representative for each of the five sections of that board. All members, including the presiding officer, shall have equal voting privilege and privilege of discussion. Presiding officers will call meetings, certify to records of agenda and take action directed by the majority vote of the membership. There will be the least possible interference with liberty of action of each body in order that the smallest possible group of accredited representatives of the department may accomplish business. Thus the three representatives concerned in the supply problem may meet, confer and dispatch business for the mutual benefit of all three services under the limitations already cited. Only when there is serious disagreement, or if matters are at issue of policy or moment to the other members of the full board, need the conferring section present a subject to the full board for action. The Board of Operations has in turn autonomy within the limits already outlined.

## OPERATION OF THE PLAN

In order to demonstrate and at the same time test this system of joint action, a concrete instance will be given. The Personnel Section of the Operations Board meets in the office of its presiding officer, Lieut. Colonel Jones of the Army, and is at once concerned with the problem of the training program to be carried on by its R. O. T. C. instructors at the 50 medical schools of the country in which "all-service" units are maintained. At these 50 schools the Superior Board has already determined that for each school only one representative will be detailed for the three services, and the Operations Board has effected an harmonious agreement for a satisfactory rotation of instructors representing the services. The Public Health member advocates the principle that a larger portion of the service curriculum be devoted to the study of preventive medicine. The other members agree but regard the matter as one of policy, since the question of infringement upon the Chair of Hygiene in the medical schools is clearly involved. At this point the navy representative brings up the question of the amount of equipment required for satisfactory demonstration to R. O. T. C. units. This leads the section into a muddle of detail concerning the cost of purchase and shipping of equipment, questions of funds available and question of hospital equipment, etc. The section finally votes to ask the Supply Section to join in a call for a full board meeting of the Board of Operations. This is done, and the board meets upon the call of Commander Truxtum of the Navy, when the entire subject is brought up for discussion. With the aid of its specialists in each section, all questions are quickly settled except that of policy in the matter of public health instruction for R. O. T. C. units. The board finally instructs the Personnel Section to correspond with every medical school and ascertain its reaction to the proposition of including a study of public service epidemiology in the R. O. T. C. course. This action is taken and, as a result of this canvass, the Personnel Division reports at the next meeting of the Board of Operations that 29 out of the 50 schools have expressed unqualified approval, 7 qualified approval, and 14 disapproval. The board votes to submit the matter to the Superior Board as a matter of policy. When the Joint Board of the three Federal Medical Services meets, therefore, Surgeon Dauntless, P. H. S., submits this question to the board, when it is finally determined to introduce the instruction only to the extent approved by each medical school individually.

The instance given may appear trivial in many respects, but will serve to show the committee principle through which specialists may separately deal with their own problems, may group with others for broader problems, and may submit to the highest board a study suf-

ficiently elaborated to be susceptible of ready decision by the chiefs of the branches concerned.

The idea of a single R. O. T. C. representative for all the three services at a medical school is not a part of this plan. Such a development could only be adopted by the unanimous vote of the Superior Board, and while the novel conception of one R. O. T. C. instructor acting as representative of all three services in a given medical school does not compare unfavorably to the picture of three highly paid agents of the three federal services engaged in a cut-throat rivalry for the attention of a group of youths, I have only used the illustration to depict the system. Of course one real or fancied objection is brought into relief by this simple example. It is the rock on which the League of Nations struck when it journeyed across the Atlantic. I refer to the obvious fact that any association entered into by independent bodies must sacrifice some degree of independence in exchange for the advantages of alliance. This, however, is an inevitable concomitant of the theorem on which this plan is laid, which itself is predicated upon an association. The plan outlined gives, I feel sure, as great a guaranty of independence for the three contracting parties as can be devised for effective correlation.

#### APPLICATION OF THE PLAN TO PROBLEMS BEFORE, DURING AND AFTER WAR

Having outlined a basic plan, let us examine in detail a portion of the superstructure. We have decided that the Operations Board shall have not less than five sections to which additional units may be added by the Superior Board if experience or public emergency, such as war or its aftermath, shall justify expansion. It is, of course, manifestly desirable to limit the number of sections and individuals to the lowest figure consonant with scientific accomplishment in specialties requiring wide diversity of talent and study. The special functions of each of these sections will quite naturally invite our attention.

The Personnel Section will have among its functions the procurement, training, utilization and disposition of medical officers for its active as well as reserve forces. The latter class alone may prove the subject of so much special thought and activity as to require the formation of a distinct section. This decision will, of course, rest with the Superior Board.

Do the three services have common interests in these peculiarly personal matters? The Great War developed the fact that they have. The great recruiting drives of the Army have developed the axiom that procurement for many and diverse branches gives better results in both quantity and quality than the same recruiting activities pursued in the

interest of relatively fewer branches. A recruiting party that can offer diverse experience and opportunity to an audience will gain more converts than one confined to a single offering, because men's tastes differ and the opportunity to choose intrigues the imagination. Applying this established principle to the procurement of personnel, the three services will each benefit by an equitable pooling of interests. Then, again, this arrangement permits a service which is flooded with candidates to help a sister service by diverting some of this stream to another service. This is not a dream, for this situation has certainly been met within the past year, when the Army, through legislative reduction, found itself in the unfortunate position of having no vacancies for worthy candidates under instruction in its general hospitals. It was relieved of its embarrassment by the action of the Navy in agreeing to accept the army candidates on the same terms under which they had been promised commissions in the Army. Again, in an entirely different circumstance the Army in being demobilized after the late war found employment for great numbers of its discharged officers in the after-war expansion of the Public Health Service. Should the services agree to correlation under this or similar plan, and should they decide to unite rather than pursue partisan tactics in our great civil medical schools, I feel sure that procurement of better material would be assured to each service under such a large-minded policy.

There is perhaps no field in which the interests of all would receive greater advancement by correlation than in that of the training of personnel. I have already used as an example the possibility of combining the R. O. T. C. training for the three services under one "all-service" instructor for each medical school. I believe the school faculties would welcome the proposition and that it would strengthen immensely the standing of the R. O. T. C. idea. That idea is now on trial and in many places it may be said to be under fire. The medical schools want to serve the Government and they want to foster patriotism, but they are fundamentally in the business of teaching medicine. There is a great deal to teach and the competition is severe. Schools must run a most varied curriculum to meet the demands of modern practice and the requirements of State Examining Boards. The spare hours are few enough, and the student needs them. When one service asks the medical school for an occasional hour, the faculty may agree; but when three federal services separately make such a demand, I am inclined to believe that the schools will strike. Even did they not, the services will find it increasingly difficult to furnish instructors, since it is costly for the Government to furnish two or three high-grade representatives to each of three score first-class medical schools, espec-

ally when it is apparent that the instructor can only have an occasional hour for a relatively small number of students. By combining these separate courses into an all-service course and thereby enlarging the field of interest and the audience while at the same time reducing the number of instructors, the results will be infinitely more satisfactory to the schools as well as to the three services. This, however, is, as I have already said, a matter which would have to receive the unanimous approval of the Superior Board in order to be effective. The idea has been enlarged upon in order to demonstrate one possible form of correlated activity under this plan.

The training of the active list officers of the three corps will undoubtedly be materially broadened and improved under a system of correlated activity. Each service now has certain special fields in which its opportunities and achievements surpass its fellows. While there is already some interchange of opportunity for training, it is not cultivated as fully as it might and should be. The special service schools, special laboratories and larger hospitals of each service offer greater opportunity for training of personnel than is realized, and a coordinated system of exchange of these privileges of research and study would benefit science, enhance the value of a commission and increase the morale, as well as the qualifications of the personnel of each of the services. This fuller development of broad, special training would also render personnel of one branch more readily suitable for the emergency of another in the vicissitudes of the public services in peace and war. In time of public emergency, when the demands of one branch far exceed those of others, this catholic training will increase the value of all three corps to the nation. In the present epoch at least the tides of the public services seem to have so rapid rise and fall that it is a fortunate circumstance that the ebb tide of one service, reflected in wholesale discharge and reduction, frequently finds a flood tide of demand in a sister service.

In time of war the advantage of a correlation in supply and demand of personnel is invaluable, for through this relationship the most pressing need can receive priority. It is also to be remembered that, through the present somewhat haphazard means of obtaining reserve personnel, one service may very easily enroll practically all of the leading men possessing a certain special qualification to the serious embarrassment of another service. For example, the Public Health Service may by chance enroll practically all of the reservists who have any special knowledge of ship hygiene. When war emergency comes the Army may not be able to find in its reserve men highly trained in this special field. In such event, through the liaison of its personnel section, its

urgent needs can be supplied by the sister service. In the aftermath of war, the opportunity may come to the Army to repay this assistance by furnishing the Public Health Service with numbers of men who in the vast hospitals of war have become fitted to operate similar institutions for the care of the physical derelicts of war.

These are, of course, obvious generalities. Every personnel expert, however, knows another kind of demand which often taxes his utmost abilities. He may be hurriedly summoned to the office of his chief, where he finds the high ambassador of some dread potentate, of home or foreign brand. It eventuates that the enemy has devised a poisonous vapor which eludes the defensive properties of our gas masks. The personnel officer is commanded to rub the Aladdin lamp of his index file and produce six scientists who have made this particular gaseous vapor their one thought and study in life. Perhaps he actually has six on his cards, but he can only produce five, for the sixth caitiff is in Peru, or he has the typhoid fever, or he has unaccommodatingly left this world. The personnel officer, if true to type, would rather follow the fellow to the next world than confess failure. The personnel section of the Operations Board is his salvation. He calls his fellow-craftsmen of the two other services and tells his extremity. Between the three of them they drag forth a culprit nurtured since childhood on phospogene, mustard gas and chlorine, and the call is filled.

The supply service is similar in principle to the personnel and is just as susceptible to the advantages of cooperative association. The fact that in one case the game is to handle groups of men and in the other carloads of material does not lessen the value of relationship. We have precisely the same result in administrative economy and efficiency in peace time, the same benefit of pooled interests when war demands subordination of every element of selfish individualism for national security, and the same market for the amassed stores of prodigal war in the tremendous burdens of reconstruction. We have all passed through these three stages so recently that detailed rehearsal of the precise advantages of cooperation between the three services in handling stores, hospitals and problems of sanitation, organization and equipment can only be tedious to the reader. Just how much assistance can be derived by each of the services in effective accomplishment through this relationship depends solely upon the sincerity, enthusiasm and intelligence with which the representatives of the three services enter into the partnership. In the supply business, the study of markets, the combined purchase of stores, and the allocation of surplus in one branch to meet the dearth of another suggest the potentialities of the correlation. Moreover, under the elastic quality of the proposed organi-

zation, each service preserves its independence and each section of specialists can work out its own problems, only appealing to the parent boards when community of interest or general policy so demand.

That the pooling of hospital facilities of the three services is far from visionary is demonstrated by present actualities when the law empowers the U. S. Veterans' Bureau to utilize the hospitals of any Executive Branch of the Government in caring for the invalid of the recent war. It can be fairly said that, had an effective correlation of these three federal medical services existed prior to this war, the tremendous burden suddenly thrown upon the Public Health Service without adequate provision of funds, organization, suitable hospitals or equipment, would have been borne with far less stress and strain.

Taking events in sequence, however, let us refer a moment to the plans for hospitalization in preparation for war. Each service is now independently seeking to organize hospital units in preparation for that eventuality. The accepted method is for a given service to propose to a civil hospital or medical center that a reserve hospital unit be formed from its staff. The institution designates the hospital commander and his staff who receive commissions in the service to which the unit pertains. Now the present independent or cut-throat system has manifest defects, as I have already indicated. The Army may arrive first in a given field and secure the staffs of all desirable hospitals for its purposes. The only resource remaining to the other services is to take inferior material which is, of course, unacceptable, or to attack and undermine the rival service which is embarrassing to the civil authorities and mighty poor business in the long run for the Government. It will certainly be far wiser for the three to come together and in a decent way agree to share the field, remembering that, after all, the basic purpose is to prepare the Republic for war and not outwit and embitter the sister services. This can be done easily and harmoniously by getting together. By staying apart, antagonisms and antipathies create insuperable barriers.

As in preparation for war the custom of fair play is engendered, in time of actual war a spirit of mutual consideration will continue. It must be admitted that war makes responsible officers extremely jealous of surrendering their assets to friend or foe, but it may also be recalled that under our plan no member of the Superior Board is subject to the majority vote of that board if the requirements of his departmental superiors are at variance with the mandate of the board. No one service therefore need fear that it will be bludgeoned out of its own hospital or other facilities by this tribunal. It may be expected that the heads of the three services meeting under war conditions will recog-

nize clearly their primary duty to the nation and will put hospitals where the need is greatest, regardless of all partisan consideration.

I have already referred to the aftermath of war in relation to the hospitalization problem. The attention given to this matter in the past five years by the American people, by the President and the Congress evidence its national importance, and the difficulties encountered have proven the inestimable advantage of correlation between the three services in this field. It may be expected that in a future war under such a cooperative system the hospital plants, supplies, personnel and other perquisites which have been built up in the home territory during the war will be in large measure continued in their entirety during the period of demobilization and reconstruction, gradually being transmitted into permanent plants and organizations for the constant remainder of the war invalid.

The advances in organization and equipment which will result from the combined attention and universal experience of the three services is intriguing to the imagination. During the preparatory or peace period, the impetus resulting from friendly rivalry and interchange of experience and viewpoint must be tremendous. The developments along these lines in each service will be focused in the activities of this section of the Operations Board, and, as in other fields, will result in increased accomplishment at far lessened cost to the Government. Consider for one moment the fact that each service independently expends time and money in seeking the best type for the same article of equipment. No doubt each one adopts a type superior to the others in certain respects, but it is not probable that any one branch attains all the advantages and none of the disadvantages of the three types. I wish to emphasize and make clear at this time that the correlation proposed under this plan does not for one moment contemplate that the individual problems of one service need occupy the time and clog the activities of the other services or the sections and boards proposed by this plan. Each service will have in preparation for war, during war and in its aftermath its special and distinct problems of personnel, supply, organization, hospitalization and disease prevention, and these special problems need only be agenda for the Superior Board, the Operations Board or its sections when community of interests creates the basis for conference. This idea of the preservation of the individuality of each service applies to all problems, but especially to the field of organization and equipment. Military organization is, for both Army and Navy, largely determined by a General Staff. The problems of each service are largely individual, and the points of contact and community of interest are less frequent. This section of the Operations



Board would not, therefore, be concerned with the details of organization and equipment pertaining solely to one service, but would devote its attention to affairs of common interest. Even with this restriction its agenda and field of usefulness in preparation, during and after the war would be ample. If we consider the subject of equipment alone, the advantage of the association is manifest. During the preparatory period, for example, all three services independently study the problem of a mobile field delousing equipment. Combined effort would reduce three processes to one and result in standard equipment having the advantages of all. While it is true that in peace time there is a slight possibility that the equipment officer of one service will obtain the benefit of the study of the corresponding officer of the other services, it is even less in time of war when each service and each division of each service is so tremendously occupied with its own problems that it is apt to be totally unconscious of all else. Thus in war one branch may have early discovered by disastrous experience that a certain surgical splint is unsatisfactory. An advantageous modification is devised and used perhaps for months before the Medical Department of the sister services passes through the same process of disastrous experience, wasted effort and time in perfecting new equipment. The committee action of the section and the board action in policy offer advantages also to this field of organization and equipment in the period of reconstruction. At the outset of this trying period all three services face similar problems. The tremendous burden of care and treatment of the nation's invalid war veterans presents problems only second to those of war itself. Had there been a firm and recognized correlation of the three services during our recent after-war period, far more effective service could have been rendered our war invalids at infinitely less cost and greater satisfaction to the American people. The best possible evidence of the need and practicability of such organization is shown by the fact that the President of the United States has seen fit to create a National Advisory Board for the care and hospitalization of war invalids.

#### APPLICATION OF PLAN TO PROBLEMS IN SANITATION

There is no field in which the coordinated activities of the three federal medical services offer broader possibilities of usefulness to the nation than in the study and conquest of the larger problems of preventive medicine, epidemiology and sanitation. Since the establishment of the three executive bureaus of Treasury, War and Navy, the three respective Medical Departments have to a marked extent operated independently in this field. Rivalry and individualism have been

conspicuous features of the efforts of the three services. Cooperation upon the part of the three governmental agencies in a battle of infinitely greater import to the welfare of the people than political or military warfare has been signally lacking. This absence of team work has, beyond question, restricted the activity of the Government in the field of preventive medicine and has favored the development of private agencies in this direction. Notwithstanding this fact, it is certain that the accomplishment of the medical officers of the three services in preventive medicine has brought high honor to American medicine and has been the means of reducing sickness and death from preventable diseases in many sections of the United States and other lands. It is only reasonable to assume, therefore, that even greater achievement may be expected from coordinated activities of the three medical departments. In time of peace it is true that the Public Health Service, as its name indicates, is primarily expected, as a public agency, to study and combat pestilence and preventable disease in civil communities in the United States, but this duty in its largest sense is also a primary obligation of every doctor of medicine, whether in civil or government employ. Medical officers of the three services have in the past rendered and will always render conspicuous service in this glorious struggle to benefit mankind.

How may the correlation of the three Medical Departments under our plan be expected to effect progress in preventive medicine? Through the association required by this plan, the chiefs of the three departments and their assistants will inevitably become co-workers in the fight against disease. The Sanitation Section of the Operations Board at its regular and special meetings may be expected to achieve unanimity of endeavor, which will in turn be imparted to the parent boards and to individual workers of each department. The experimental labors of one service will be useful to all. For example, let us assume that each of the three services independently has undertaken to study the cause and prevention of pellagra. The observers of each service may spend valuable effort, time and money in carrying through precisely the same experimental work with the same result, whereas through cooperative endeavor each might have pursued a distinct line of investigation with three chances of success against the one chance of the old partisan system. It is, of course, true that scientific men publish their experiments, and it is also true that multiplicity of endeavor is often necessary in knotty problems of preventive medicine, but the basic principle of cooperation is sound although the example may be weak. Moreover, it is a fact that men working in cooperation become broader and more generous towards one another, whereas

partisanship always tends to narrow, restrict and impede development and progress. It is therefore logical to believe that the three services will, through correlation, be capable of greater achievement in the field of sanitation than as, at present, working independently.

In time of peace, therefore, the correlation of the three services will advance the theory and practice of preventive medicine, thereby contributing to the good of all mankind, and will at the same time benefit the civil and military groups whose well-being is the particular responsibility of each service. As a measure in preparation for war, the personnel of each service will through this catholic relationship have wider experience and better training to cope with the sanitary problems of war and will be better qualified to enter upon the duties of a sister service when the exigency of one coincides with the relative inactivity of the other. Let us assume, for example, that the plague obtains a foothold on the Pacific Coast and assumes epidemic proportions at San Francisco. The Surgeon General of the Public Health Service asks his colleagues of the Superior Board to assist him with personnel and supplies. The Operations Board is assembled and quickly instructs each section to hold committee meetings to effect speedy support to the Public Health Service in doctors, laboratory technicians, nurses, supplies, hospitals and any required resource. In this way one service helps the other and at the same time secures for its own personnel valuable training in the control of epidemic, for beyond question practical experience in this work is the most valuable form of instruction. It must not be forgotten that every war has its epidemics. No government medical officer is fully qualified to meet possible responsibilities who has not a basic training and experience in the control of epidemics and reduction of incidence of preventable disease.

The advantage of this association in time of war furnishes another example of the desirability of the relationship. Now, however, the shoe is on the other foot. The expeditionary forces or mobilization camps of Army and Navy encounter difficult problems of disease control. In the Public Health Service they find expert co-workers in fighting the battle against epidemic and preventable disease. The experience, training and lessons of peace time bear fruit in the cooperative effort under war conditions. Moreover, the Public Health is materially benefited by the coordinated activities of the medical services under war conditions. In the World War the United States mobilized 6,000,000 men. These men were given protective inoculation against the typhoid group and smallpox, and under certain predisposing conditions against pneumonia, tetanus and other diseases. They learned something of the etiology of malaria, uncinariasis, venereal disease and

other widely disseminated, preventable diseases. In thousands of instances these diseases were discovered and eradicated. Each of these cured patients became a missionary of public health when he returned to his civil community. By the rigid physical entrance examinations, instruction in personal and public hygiene, eradication of existing communicable disease, instruction in cause and prevention of preventable disease, the benefit to the American people as a whole from this mobilization of 6,000,000 men may be estimated as a blessing worth the entire money expenditure of this nation in the war. This work was not done by one service but by all three working in harmony though not with a direct machinery of cooperation. The constant accomplishment under such correlated effort may be to some extent visualized from the tremendous advance in the public health produced during the war period.

In the after-war period, the greatest gain to be expected is in carrying through the mighty stroke of the war effort. The tendency is to relax and relapse. This must be countered if permanent benefit to the race is to be achieved through the possibilities of mass education presented by war conditions. The training in personal and public hygiene imparted to men in war must be carried into their communities and homes in the after-war period to become life habits of the individuals and through their example the accepted custom of the nation if progress is to be made. In this philanthropic labor, the coordinated efforts of the three governmental public health services will accomplish far more than the non-correlated acts of the separate departments. In such public problems as that of the reduction in the occurrence of venereal disease the experiences and training of each service will be of value to the others. Of course these titanic contests could well be conducted by a National Department of Public Health whose head sat in the Cabinet of the Chief Executive with power under law to direct all public agencies engaged in the care of the public health. As I have already pointed out, the probability of such central control of the public health does not appear immediate, but the conduct of a campaign against preventable diseases by the agencies already existing under a plan of correlated activity is not only possible but easily obtainable by the joint effort of the three departments.

#### SUMMARY AND CONCLUSION

In this essay I have sought to show the need of a correlation of the three medical services of the Government; the present system with its defects and its suitability to a simple plan of co-relationship; the plan under which this association may be established; and the application of the provisions of this plan to practical problems in the periods of war

preparation, conduct of war and reconstruction. I have assumed that legislative activity for the creation of a Central Department of Health would encounter successful opposition from the three departments, the Congress, the states governments and the American people; and for this reason have offered a plan which would interfere in the least possible degree with the several agencies which would otherwise oppose the association. The proposed plan is capable of immediate execution at the will of the Chief Executive, or by the concurrent action of the three Secretaries of Treasury, War and Navy. It is true that its successful operation will require the team work of services which have formerly operated separately, but there are many reasons why this is the most favorable time in the history of this government for a voluntary cooperative association of this character. The necessities of war and the even more disturbing governmental unrest during the post-war period have established a strong feeling of common interest between the three services. Community of interest, endeavor and professional background form a firm foundation for successful and permanent correlation.

SCHEMATIC ILLUSTRATION OF PLAN FOR CORRELATION OF THE THREE  
FEDERAL MEDICAL SERVICES

*Superior Board*

*Membership:*

Surgeon General of the Army.  
Surgeon General of the Navy.  
Surgeon General of the Public Health Service.

*Powers:*

Appointive of Operations Board.  
Creative of Sections of Operations Board.  
Decisive of policies and problems of common interest within jurisdiction of its members.  
Advisory in questions of common interest requiring higher executive or legislative action.  
Directive of activities and agenda of Operations Board.

*Operations Board*

*Membership:*

Designated representative of each service for five or more sections.  
Personnel.  
Supply.  
Hospitalization.  
Organization and Equipment.  
Sanitation.

*Powers:*

Decisive of matters of common interest within jurisdiction of its members.  
Advisory in questions of common interest requiring higher action.  
Directive of activities and agenda of its sections.

## "INFLUENCES OF THE WORLD WAR ON THE DEVELOPMENT OF CIVIL PRACTICE"

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HONORABLE MENTION, THE WELLCOME SECOND PRIZE ESSAY, 1922

NO ONE mind can well encompass and comprehend the entire field of modern medicine. It is too gigantic in its scope, too protean in its nature. Nor can one man attempt, unaided and of his own limited experience, to sum up the effects of the recent war upon the development of this ever expanding and ever growing science—the medicine of today.

The author feels that in spite of forty-five months of active participation in the tasks and problems growing directly and indirectly from the great struggle; in spite of the many angles from which he had opportunity to view the work that was presented; though seeing it at close range where all prospective was distorted and he became submerged in the maelstrom of a great, and almost historic epidemic, the typhus of Serbia; though involved in creating from practically nothing a working hospital to meet the stream of battle casualties; though seeing it again from a distance and in clear perspective, with every effort concentrated upon lucid analysis of the progress made in realms of surgery, that there might be taught to those who were to participate directly with the fighting men how best to care for the wounded; though there was opportunity for further study in a great and well-organized military hospital in connection with a group of patients about whom centers one of the most fascinating chapters of the medical history of the war—in spite of all this diversity of viewpoint and in spite of the privilege of closely observing the immediate results in three well-established civil hospitals and one great medical school, he feels that he is wholly incapable by himself of attempting to summarize and accurately express the effects of the war lessons on civil practice. Therefore in approaching this subject he has sought from many sources the opinions of thinking men engaged intimately in the science, or the practice, or the art of the medicine of today.

Accordingly a questionnaire was prepared and sent to a selected list of doctors: to some engaged in medical education, to some engaged in research, to some engaged in the practice of highly technical subdivisions of the general field, to some engaged in modern medical administration, and to very many engaged in the practice of the art itself. This questionnaire sought to gather the opinions of thoughtful men as

to the effect of war teachings and experiences upon modern medicine from the standpoint of (1) medical practice, (2) medical education, (3) medical administration, (4) medical organization, (5) the lay-mind, and (6) the doctor himself. It was briefly worded, so as to allow the greatest possible latitude of expression.

The percentage of replies received may be taken to some extent as an index of the interest of the whole profession in this subject. However, it cannot be regarded as an absolute index, because the investigation was carried out during the summer months and a number of replies were lost that might have been received had the doctors in question been at home and engaged in their regular routine. Only 20 per cent of replies were received. It was frankly disappointing. However, the character of the replies made up in great measure for the low percentage, for they showed a degree of interest and careful thought in their preparation that justified their use as a nucleus around which to construct some reasonable estimate of the effects of the lessons of the war. The author has therefore felt encouraged to proceed with his theme and to place before his readers the results of his investigation.

The first presentation will be that of the direct results of the investigation, the summarization of the replies received from the questionnaire. From this the readers may draw their own conclusions. Here it must be taken into consideration that, of all the doctors actively engaged in their profession at the time of the war, about one-third were drawn into one or another of the federal or humanitarian services. It is inconceivable that such a large proportion of men should fail to profoundly affect, out of the store of their personal experiences, the opinions and conduct of medical practice today. Later the author will attempt a general summary of the whole situation and venture a few ideas and opinions of his own, based to some extent upon his direct investigation, and to some extent on his own observations and experiences.

#### I. THE PRACTICE OF MEDICINE AND SURGERY—WHAT VALUABLE CONTRIBUTIONS HAVE BEEN MADE?

Three men were candid enough to say that in their opinion no great new contribution had been made to the actual practice of medicine or surgery. They were, respectively, the dean of one of the leading medical schools of the country; a man long engaged in clinical teaching in another leading medical school; and a clinician identified with research work in a large city. However, each of them qualified his statement with the admission that in certain fields much good had been accomplished but that the benefit hinged, not on new discovery, but on the standardization of procedure.

On the other hand, there was hardly a man that did not feel that in some one or another of the many medical activities of the war there had been contributions which, if not actually new, had at least the merit of being notable achievements. Most frequent comment was accorded to the improved technique in the treatment of wounds and infections. Forty-five per cent of those replying to the questionnaire felt that in this field there had been accomplished work of exceptionally high order. Carrel, Dakin and their collaborators came in for the major recognition, but many others emphasized more highly the achievements of Lemaitre, Bowlby, Moynihan and others in debridement and immediate surgical sterilization of wounds with the resulting obviation of infection. One prominent New York surgeon stated: "In my opinion the introduction of wound excision in a really satisfactory way would almost justify the sacrifices of the war."

Next in order of recognition was the surgery of bones and joints, and then, in order of frequency of mention: thoracic surgery, preventive medicine, neuropsychiatry, preventive and therapeutic work in diseases of the respiratory systems. Casual mention was accorded to the achievements in camp hygiene, plastic surgery, X-ray technique, especially in reference to the localization of foreign bodies, neurosurgery, physiotherapy, and studies in shock.

Although thoracic surgery was mentioned less frequently than either the care of wounds and wound infection, or the treatment of fractures and joint injuries, the remarks in connection therewith were the most enthusiastic in this entire discussion. Opinions were expressed to the effect that the real beginning of thoracic surgery should date from this war, as the fundamental concepts of the methods of surgical approach and freedom of action within the thorax itself had been so radically altered, and so much more latitude of action had been proved possible. Naturally Pierre Duval was singled out for special praise. The notable contributions in this field also included the careful studies made in empyema and the clear differentiation of empyema of streptococcus origin from other empyemas, and the very clear demonstration of the relative advantages and applicability of the several procedures open to the surgeon in the initial care of the acute stage of this disease.

Certain comments may well be singled out for special mention: The probability of the development of special hospitals in or near the great industrial centers to care for accident cases (wounds, burns, fractures, similar conditions) which in the general hospitals are apt to be regarded as necessary evils coincident with the conduct of such an institution; the value of well-organized physiotherapy as an adjunct department to the surgical and medical services of general hospitals; the value of



definite efforts toward mental hygiene as a prophylactic agency in neuropsychiatric problems. Finally, the gist of the whole situation has been well summed up by one known the length and breadth of this country and recognized as a master mind in medical organization: "The practice of medicine and surgery was placed upon a higher basis inasmuch as the medical profession succeeded in coordinating in diagnosis and in practice all specialties of medicine and surgery, thus obtaining mass investigation in contradistinction to the old individual methods."

In the field of preventive medicine the most notable achievements were deemed to have occurred in relation to typhoid fever, typhus, venereal diseases, diseases of the respiratory tract, tuberculosis, functional heart conditions, trench fever, meningitis, gas gangrene, tetanus and influenza.

## II. MEDICAL EDUCATION

Only one idea was presented by a sufficient number of men to carry any serious weight, namely, that there was a surprising lack of knowledge on the part of the average medical officer, drawn from civil life, as to the fundamentals of preventive medicine and the hygiene of large masses of men. Such an ignorance stood out as a fact that could not be gainsaid and called then for most serious consideration on the part of those in executive and administrative control of the federal services, and should now call for equally serious consideration on the part of those engaged in the active teaching work in the medical schools throughout this country. Attention will later be called to the fact that there was a general public awakening to the value of preventive medicine and to the beneficial results where it was effectively carried out, and that in the years to come it is reasonable to assume that the general public will demand a greater knowledge of effective means to prevent the spread of the commoner contagious diseases. To this end there will probably be a demand for more thorough education in the medical schools in prophylactic measures and for fostering the now-existing schools in public health and for the creation of other similar schools of public health as occasion may arise.

Another concept put forward by several men was the fact that the war had seriously disturbed the old availability of foreign clinics as places for postgraduate study and that this country had demonstrated that it could provide, in its own medical centers, facilities for advanced study and research equal to anything that had previously existed on the European continent. As time goes on it is conceivable that more such centers will be created to provide advanced instruction, either for the individual who desires to restrict his practice to some one particular field or to permit the busy general practitioner an opportunity to "brush

up and keep abreast of the times." Thirty per cent of the men replying felt that there was a markedly increased tendency on the part of doctors in general either to definitely specialize in some one field or to avail themselves periodically of the advantages of postgraduate instruction.

Many men who were in position, from their connection with the larger medical schools of the country, to know the facts as to registration and enrollment of students called attention to the fact that during the active war years there had been a decreased enrollment of students and that the average quality of the students had depreciated, but that once the war was over there was a greatly increased enrollment in medical schools and that not only had the number of potential doctors increased but the quality and standard of the men seeking medical education had greatly improved.

Apart from the comments just noted there was a wide divergence of opinion as to the effect of the war upon the policies of the medical schools and practically no constructive comment.

### III. MEDICAL ORGANIZATION—HOSPITAL ORGANIZATION—PROFESSIONAL INTERRELATIONSHIPS

The dominant idea under this heading was that group medicine had been given a tremendous impetus. Although group practice had existed prior to the war, there had always been questions in the minds of many as to its aims, its ethical status and its desirability. Personal experience on the part of a great number of men in the well-organized and disinterested work of the great military hospitals, where the interests of the individual had always to be made subservient to the good of the great mass of ever-coming and ever-changing patients, showed them that teamwork, logical division of labor and mutual aid and assistance, served to expedite the work, shorten the day and improve the ultimate result for the patient. The quotation made earlier as to the success in coordinating in diagnosis and practice all branches of medicine and surgery is especially applicable here. In not a few instances, associations formed during the war became the nuclei of post-war groups, and men sought to band themselves together for their mutual advantage and to the end that they might afford more effective and thorough care to the patients coming to them for aid. It therefore is safe to say that the war did popularize group practice and made it something that has come to stay.

There was a unanimous opinion that both medical organization and hospital organization had been improved by the war. There was not a single dissenting voice. Thirty-five per cent expressed outright the

opinion that professional interrelationships had been improved by the war.

From the standpoint of hospital administration several comments of particular interest were elicited. Three men were very strong in their feelings that a most effective demonstration had been made, that the finest type of scientific work could be carried out in buildings of the very simplest and most elastic construction, and that fine architecture and marble and bronze were in no way essential to a perfect hospital. Hand in hand with simplicity of construction went simplicity in management and economy. One observant man pertinently called attention to the fact that the war had shown that all types of cases could be kept together under the same hospital management, regardless of whether they might be medical or surgical or even contagious or mental. He also added that it had developed a new profession, that of "hospital administrator," something more than "hospital superintendent," a profession requiring special training in many branches besides medicine, pure and simple. It is only fair, however, to meet this statement by the comment that to gather a great variety of cases under one and the same hospital management requires a very elastic, physical plant and a staff that is very protean in its makeup, and that not infrequently the most notable achievements were obtained in hospitals where the entire energy of the professional personnel was devoted to meeting the problems of some one particular type of cases.

Many felt that a great impetus had been given to hospital standardization and that the completion of this big program, as started by the American College of Surgeons, would be earlier and more effectively reached by virtue of the experiences of the war.

Another comment that strikes home with peculiar force, although brought out clearly by only one man, is the value of the out-patient department in relation to the rest of the hospital. Comparing the triage of the war hospital to the out-patient department of the modern city institution, he presents a strong brief for the development of this part of the hospital, not only as the place for all initial contacts between patients and professional staff but also as a place to coordinate all efforts at diagnosis and treatment and to determine the ultimate policy to be adopted in relation to each individual case.

That physiotherapy and occupational therapy should have a definite place in the scheme of all hospital organization was briefly commented upon by a few men.

It seems to the author that one comment was possibly overlooked in the discussion upon hospital organization. It was quite generally conceded that the work in bone and joint surgery stood out as an

accomplishment of high order, also that the immediate treatment of wounds was on an exceptionally high plane, but no one called attention to the fact that in each of these active military hospitals there was present, continuously, a medical personnel comparable not only to the house staff of the typical civil hospital, but a personnel also comparable to the attending or visiting staff, and that operating-room teams guided by experienced and competent men were in constant readiness to meet the convoys of wounded that kept pouring back. It was a necessary result that immediate, adequate and definitive treatment was available to all patients as soon as they had passed through the triage and had there received the benefit of the mature and sound judgment of the men entrusted with the duty of determining the policy to be adopted in relation to each individual patient. The results should have been good, and they were good. Contrasted to such an organization, the typical civil hospital does not have available at all hours a professional personnel any more mature in their judgment than the usual house staff. Therefore, if the same high standard of attainment in traumatic surgery is to be obtained in civil practice as was obtained in military hospitals, there should be constantly present some member of the staff who has been particularly trained in the requirements of this difficult field and is competent to carry out definitive treatment.

#### IV. ADMINISTRATIVE MEDICINE—HEALTH DEPARTMENTS

Comments under this heading were rather vague but 75 per cent agreed that the war experiences had been of decided benefit to the work of municipal, state and federal health authorities. Opinions had been particularly sought from those in high authority in federal and state health departments, and all were agreed that their work had derived much good from war experiences. Only one man came out with the flat-foot opinion that there had been no change at all in the situation. A number of factors were cited as being responsible for the benefits to the health departments. They included a general awakening of interest in matters of public health and a desire on the part of the different communities to cooperate with the legally constituted health authorities; the mobilization of approximately five million men had also given an unprecedented opportunity to demonstrate the application of public health control on a gigantic scale and the demonstration had on the whole resulted in marked success; many doctors had been given practical experience in this field of work and could be utilized for similar duties in civil communities. However, more than one commentator wisely remarked, as has already been indicated under the heading of "Medical Education," that the results achieved by different men varied widely as did their previous training in this highly specialized

field of medicine and that to have the maximum of success a man had to be particularly trained for the work in question.

Particularly valuable demonstrations were given in the control of typhoid, of diphtheria, and of venereal diseases, all of which are common to civil communities and against which all communities are apparently more ready to wage active warfare.

#### V. THE EFFECT ON THE LAY MIND

Opinions on this subject were sought not only from the doctors but from many non-professional individuals. It is frankly a hard subject to discuss, and the replies ran the whole gamut from outspoken pessimism to extreme optimism. The preponderance of opinion was decidedly on the side of the optimists. It is impossible to find any basis for making a quantitative analysis of the replies under this heading on account of the great difference in the ideas presented.

Again under this subject the effect of the great demonstration in preventive medicine was emphasized. Five million men were directly taught and many million more were indirectly shown its value, especially in regard to diseases common to crowded communities, to diseases transmitted by insect pests, and to venereal diseases. The whole world was given an opportunity to witness gigantically organized medical campaigns against two mighty epidemics, typhus and influenza. Millions received a demonstration of the benefits of routine periodic physical examination, demonstration that came home with peculiar force to a complacent public when the figures of the draft boards showed that a surprisingly large number of men were found to be unfit for service on account of really preventable conditions, the rejections in some states going as high as 40 to 50 per cent of all those examined.

A rather common comment from the lay-public had been that of regret at the possible passing of the family doctor, inasmuch as they have seen an increasing tendency on the part of the members of the medical profession to restrict themselves to certain definite fields of medicine. Many view the situation with regret, some with actual alarm. Yet they are willing to concede the advantage to themselves of having more men of higher professional attainment, available in case of special need.

Perhaps it is best for the author to quote the reply of one who has spent many fruitful years in guiding great and far-reaching medical and surgical enterprises in this country, one who has had his hand on the pulse of public and professional opinion and is in a position to interpret the signs of the times, not only in this country, but in other countries as well.

The effect on the lay mind for the people of the various nations engaged in the war is so far-reaching that it will be a generation before it can be adequately comprehended. Unfortunately the United States was not in the war game long enough for her people to be so impressed with the effectiveness of scientific medicine and medical organizations as were the people who were in the war for four years instead of for two years. There is scarcely a soldier who served in the European War who does not desire now, and who does not demand if it is possible for him to demand, the same methods to keep himself and his family well as were employed by the medical departments of the great armies.

The periodic examinations, the effort to treat an incipient disease before it developed, and the effort to keep well rather than to wait until disease developed; the rules formulated for the soldiers in order to keep them fit—all of these procedures were indelibly impressed upon the minds of the officers and of the soldiers alike. So impressed were the European countries by this effective administrative organization that England, France and Italy have each placed in their cabinets of advisers a Minister of Health.

If some wizard of organization could succeed in impressing upon the laymen the lessons of the war as they were impressed upon the laymen of Europe, the effect upon the future generations of the United States would be almost miraculous. There is no question that the life of the average citizen of our country could be increased at least twenty years within the next fifty years if the same methods maintained by the governments of Europe, and by our own government during the war in caring for the soldiers, could be applied to all people in civil life. All of this was more or less effectively impressed upon the lay mind, the mind that submitted to the discipline of war.

If the lay mind be taken to include also big industry, there may possibly result a demand for adequate application of the lessons taught by the war in the field of traumatic surgery, to the end that there may be saving in time and money, through the minimization of the effects of industrial accidents.

#### VI. THE EFFECT ON THE DOCTORS THEMSELVES

There was naturally much reticence in answering a question so purely personal as this. Many, however, expressed some opinion, and it was easy to see that this opinion was modified very largely by the nature of the duties which the man had performed while in the federal service. Those that had had opportunity to serve in the larger, well-appointed and busy hospitals, or had performed duties with the special commissions charged with the investigation of major problems, felt that they had derived much professional benefit which they could carry back with them to civil life. Others felt that their professional ability had suffered; as, for instance, the young graduate who was assigned as mess officer of a large base hospital in France because his commanding

officer knew that he was not only wealthy but also honorable beyond the peradventure of a doubt, and therefore preferred to trust the mess funds with him rather than anyone else.

It may not be out of place to state that hardly a man that made comment under this heading failed to emphasize the great sacrifice and cost that had been entailed by service during the war—cost in health, in money, in professional stability. However, there are not many men who did not return from service more mature, more sober, and with a higher resolve to face the problems that confronted them, and to give, out of the store of experience, better and higher service in their fields of labor. In the final analysis it is these men, comprising, as they do, nearly a third of the entire number of doctors in this country, who will determine the effect of the war upon civil practice, and civil practice in its turn will modify all the concepts of medicine. For from the schools whose faculties are composed of these same men will come all those who enter the front ranks of medicine, the family doctor or general practitioner; those who occupy the second line, the trained specialist; and those whose labors are in the rear, the educator, the research worker and the medical administrator.

#### SUMMARY

The analysis of the direct answers to the questionnaire has been completed. How can the results be coordinated and conclusions drawn that will correctly represent the effect of the whole experience upon the medicine of today—the medicine that must go into the homes of the land, the medicine that is to be taught to the increasing number of students, the medicine that is to safeguard the land from preventable disease? It is no easy task.

In the first place, if there are to be any effects at all, they must hinge about the phases of professional activity that were particularly emphasized during active war work. From the standpoint of purely technical activities, these phases were: Traumatic surgery, in its broadest sense, to include fractures, wound infection, wounds of special regions or special structures; neuropsychiatry, and here particularly from the standpoint of the etiology and incipient symptoms of the neuroses and psychoses due to external environments; tuberculosis; diseases of the respiratory tract; functional heart conditions; venereal diseases. It is fair to say that the major therapeutic efforts had to be directed along those lines and that other therapeutic efforts were quite incidental to these major activities. However, medical activities included far more than the care of those actually sick or injured. It had to embrace the prevention of disease and the selection, by physical examination, of those qualified to represent this country in its armed forces. In this

non-therapeutic field, or administrative field, the following phases stand out: Prevention of contagious diseases; control of insect-borne diseases; camp hygiene; popular education along medical lines; effective physical examination of large groups; development of hospital organization to produce the maximum beneficial results from the minimum of available facilities. If there is to be any effect at all, it must be sought in the direct or indirect outgrowth of the experiences along these lines.

The replies to the questionnaire and personal observation have convinced the author that, without any question, there have been results, and also that, as time goes on and as certain uncompleted tasks are gradually finished, there will be still further effects. As things exist today the effects may be listed under two headings—actual effects and potential effects.

#### ACTUAL EFFECTS

Five distinct, actually accomplished effects present themselves.

Preventive medicine has been placed upon a very much higher plane. The people have been taught its value and have learned to discriminate between effective and non-effective measures. The war has demonstrated what administrative procedures will produce the best results. The war has also shown the correct relationship between the laboratory and the executive office. The general public, realizing now that it is comparatively easy to maintain a high standard of health in any given community or locality and that certain diseases may be actually eradicated, are going to demand that they be protected from economic loss occasioned by preventable diseases and the medical schools, through stress of public opinion and demand, will be made to emphasize this phase of medicine in their curricula.

Group medicine has been popularized to a degree that far exceeds anything existing at the outbreak of the war, and it is fair to assume that within a relatively short time there will be scattered, over the entire country, groups varying in number and composition but all formed primarily to render more expert service to their patients. This does not necessarily mark the passing of the family doctor or the general practitioner, for there will always be a demand and need for the man who can go into the home and guide the family through an emergency.

Most of the concepts regarding thoracic surgery have been radically changed, and a distinct improvement has been noted in the attitude toward such problems as empyema and lung abscess. So far, however, as civil practice is concerned, the traumatic phase of the war work will have less bearing, for thoracic injuries are relatively uncommon. Already in a few hospitals and clinics thoracic surgery has quite rightly been differentiated from general surgery, just as, long ago, genito-urinary



surgery was differentiated from general surgery. Let us hope that the war has hastened the day when all over the country it is recognized, that the scope of thoracic surgery has been greatly increased, but that for best results its prosecution should be placed in the hands of those that are accustomed to intra-thoracic work and the particular anatomical and physiological requirements to its successful execution.

Physiotherapy has come out of the experimental realm to the position of a demonstrated necessary adjunct to the work of the orthopedic surgeon and the neuro-surgeon. Its procedures have been standardized, its limitations have been established, and its value very amply proved. Also it has been shown that, for its successful application, the control of this department must be centered in the hands of one who has adequate time to do full justice to each individual problem presented to him by his other professional colleagues.

In response to an expressed demand for greater facilities in post-graduate study and instruction, the few existing centers have been amplified and strengthened, and new centers are being created.

#### POTENTIAL EFFECTS

In classing certain effects as potential rather than actual, the author feels that it is only a question of time before they, too, become actually accomplished facts and are incorporated into the scheme of present practice. At this point also a variable factor is introduced, the index of receptivity on the part of the chiefs of different clinics and hospitals. Some men are more prone than others to accept and incorporate into their systems of practice the proved and demonstrated good points of others; and some men, for some psychological reason hard to explain, are peculiarly reluctant to accept as good anything coming from a military hospital. They ask: "Can any good thing come out of Nazareth?" "Can the Army show us anything worthy of our attention?" The low index of receptivity on the part of certain men is going to prevent certain great benefits from immediately becoming widespread and keep them in the category of potential effects.

These effects hinge primarily not on new discoveries that tend to revolutionize all practice but on the standardization of procedure in the fields covered by the major efforts of war work. They have already been enumerated but can be recapitulated here: The immediate surgical sterilization of wounds with primary closure; debridement and secondary chemical sterilization of wounds; the intelligent use of chlorine antiseptics; the value of the standardized skeleton splints, such as the Thomas splint, etc., as a means of fixation of fractures and other traumatized extremities before attempt at transportation; the plans of

treatment, immediate and secondary, of wounds of the chest, head and peripheral nerves; widespread use of physiotherapy in connection with orthopedic surgery, traumatic surgery, and neurosurgery; importance of isolating carriers of economically serious organisms; the more humane and broadminded care of neuropsychiatric patients; better and more intelligent approach to functional heart disease. Standardization is bound to pervade the practice of medicine. It has come already in many technical procedures, and it has come, not through any one great genius stumbling upon a new and perfect procedure, but by careful study of long and tedious series of cases, comparison of end results and gradual evaluation of definite, technical steps leading to a perfection of technique. As a rule it takes a generation or more to standardize any surgical or other technical procedure. The war allowed more rapid standardization for three reasons—the very great volume of work within a very short time, the concentration of relatively large number of cases under individual workers, and the high professional attainments of the men who gave their undivided attention to concise problems. The maximum degree of standardization has not yet been obtained because the ultimate results have not yet been critically tabulated. That work is progressing under the auspices of the federal services, but it is progressing slowly and under difficulties enhanced by the economic stress of war readjustments. May the author venture a hope—a plea—that some of the great medical institutions of civil life, with the necessary funds at their command and disposal, such as the American College of Surgeons, The Mayo Foundation, The Rockefeller Foundation or Institute, The American Medical Association or the great medical schools of the country, should get behind this work and throw their energy and resources into cooperation and collaboration with the federal services in an effort to expedite the day when an authoritative, critical review of one subject after another can be presented to the profession and there can be made available to the country some benefit growing out of the suffering and sacrifices incident to the war.

Hand in hand with standardization of technical procedures must go hospital standardization in its broadest sense. It is true that this work had its inception before the war, but the experiences of the war will hasten its completion and will bring in new and somewhat radical concepts. The internal administration may suffer a change in certain particulars, with a finer discrimination between essentials and non-essentials, and a tendency, as time goes on, to divide the work not quantitatively but qualitatively between the several members of the staff to the end that, when special aptitude and ability have been demonstrated, it may be utilized to maximum benefit.

Another potential effect will be a realization on the part of big business enterprises that traumatic surgery can, with distinct financial advantage, be placed upon a higher plane. Already industries in isolated places have realized the value of competent medical and surgical care in minimizing the loss resulting from industrial accidents. Money has been freely spent in modern hospital construction and equipment and in securing proper personnel. Even today, in at least one large city, there is a hospital devoted primarily to functional restoration in this class of accident cases. For the most part, however, employers, insurance companies and others liable to financial loss through these accidents have not departed from the established ways of the fathers and the grandfathers, and cases are being sent to general hospitals where, arriving, as they do, at irregular hours, they are usually cared for by members of the house staff, too young in experience to do full justice to the diversity of the problems presented. Big business can best be approached through its pocket-book, and when it awakens to a realization of the financial value of the intelligent application of these standardized procedures, it will be ready to subsidize and maintain hospitals with full-time personnel of trained surgeons, not embryo surgeons.

Finally, the people at large, learning of certain notable achievements, may require of their medical attendants a new attitude, an attitude that will subordinate individualism in medicine to a frank and candid admission that no one man can hope to combine all the technical knowledge and skill required to meet every medical emergency; and, while they still maintain their faith in and allegiance to the family doctor, they may make it apparent that one of his chief duties shall be to guide them early into the hands of men especially trained and qualified to meet such conditions as are frankly beyond his scope and power.



# TUBERCULOSIS EPIDEMIOLOGY IN THE WORLD WAR<sup>1</sup>

By COL. GEO. E. BUSHNELL

*United States Army, Retired*

IN WAR the presence under identical conditions of food, clothing and exposure to the elements of large bodies of men, some of whom have tuberculosis, acts like an experiment in tuberculosis etiology, as Schroeder says, and, it may be added also, as a test of the methods which are generally adopted for the elimination of the disease. It may be well, therefore, to consider briefly some of the lessons which can be derived from our recent experience.

In planning the army examinations for tuberculosis it was necessary to keep in view the interests of the Government as well as those of the individual. In civil life the interests of the latter are practically alone considered. But in time of war it is just as important to prevent the unnecessary loss of men to the service as it is to prevent the injury of those who serve when they are unfit. As Goldscheider well says: "At a time when every one who can bear arms is bound to endanger life and health the eye of the physician should be directed toward the common weal. With all consideration for the individual it is not to be tolerated that a minimal lung focus, or one that is doubtful or, at all events, causes no trouble, should become a life insurance." There was no reason, then, why we should create a privileged class of tuberculosis suspects. They, if otherwise qualified, should assume the risk which others of military age must encounter. The examination must therefore be decisive—the decision should be made at once. And it should not be made on trifling or doubtful indications. It was consequently ruled that the diagnosis of active tuberculosis should be based upon the presence of râles (which, according to many, indicate a too advanced stage of tuberculosis to be tolerated as the decisive sign), evidences of arrested tuberculosis, if of any considerable extent, constituting also a cause for rejection.

More than 600 physicians have acted as tuberculosis examiners at one time or another during the war, but the number of examiners was never sufficient to perform all of the work that should have been done.

It was necessary to confine the examinations, for the most part, to the larger camps and to troops expected to go abroad. Nor was the work organized in time to examine the greater part of the first army of Pershing. More than 40,000 men went overseas early in the war, for

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<sup>1</sup> Read before the American Climatological and Clinical Association at their annual meeting Lenox, Mass., June, 1921.

the most part not reexamined for tuberculosis. And many organizations, such as stevedores, forestry and engineer regiments, escaped examination at a later time, the reason being in part the failure to learn in time of the existence or of the prospective departure of the organization in a period when all movements of troops were kept secret—in part the fact that examiners could not be spared for the purpose.

The examiners comprised very many of the best men in the United States in their specialty, but it cannot be claimed that all were equally expert. It was simply necessary to do the best that we could with the personnel that was available. So great was the need at times that it became necessary to conduct schools of physical diagnosis in order to develop examiners who, however quick to learn, could not be expected to become at once expert diagnosticians after a necessarily brief course of instruction. The writer would be the last, therefore, to claim that the work of the tuberculosis examiners was always conducted in an ideally perfect manner. In fact, in some instances, it left much to be desired, but not always because of the failings of the workers. In some instances they were so cruelly overworked because of the brevity of the time allowed for examination that superficiality was inevitable. Thus, to cite the most flagrant case, one team of three examiners was obliged to go over 1,763, 1,854 and 1,944 men in three successive days. In all, the tuberculosis examiners are credited with the examination of 3,288,669 men of whom they rejected 23,991, or 7,204 per million, for tuberculosis. In so vast a total, minor and temporary errors and omissions are swallowed up in the excellence of the results as a whole.

If mention is made of imperfections in the work, this is not done in a spirit of faultfinding, but in the effort to tell the whole truth. Let no word of mine be construed to indicate a failure to appreciate to the full the admirable work of the tuberculosis examiners. It is the most pleasant feature of a long military career to have been brought into close contact with so many fine fellows; to have made so many good friends; to have learned so much from physicians who were not only accomplished in their profession but were also self-sacrificing patriots. I honor them all very highly.

It is unnecessary to say that the standards of diagnosis adopted were not approved by many tuberculosis workers. The most popular view of the diagnosis of tuberculosis in recent years, to judge from published papers, is that tuberculosis ought to be recognized by physical signs at a stage long before the appearance of moist râles, and, more than that, it should be diagnosticated by the symptoms of the patient, even though no certain physical signs support that diagnosis.

This is not the time or place for the discussion of those views. But

can not something be learned as to their correctness from the army experience? If they are correct many men were admitted into the army who had incipient tuberculosis which was undetected by the examinations. Making allowance for the possibility that army life was hygienically an improvement for many, so much so that some incipient cases were arrested, it cannot be expected that all incipient cases would have failed to become manifest under such circumstances. If there are many, therefore, who have a tuberculosis as yet unrecognized but destined inevitably to progress unless special steps are taken to arrest it, there should be an increase of tuberculosis from this source. Furthermore, if adult reinfection from man to man is a frequent happening, as so many claim, the gregariousness of the soldier, his complete disregard for the hygiene of cough and expectoration and the occasionally bad sanitary conditions of overcrowded camps and transports furnish an ideal opportunity for the propagation of this infection as they have for so many other more acute infections and the infection with tuberculosis might be expected to be furthered also by homesickness and anxiety, overfatigue and exposure to the elements. For all these reasons many expected a serious increase in tuberculosis in our army in the field.

This view seemed to be justified early in the war by reports as to the tuberculosis of the French army. As you will remember, the 86,000 soldiers whom Landouzy reported to have been found tuberculous created a sensation in this country. If the French soldiers are falling victims at such a rate, what will befall our soldiers when they, too, are quartered among a notoriously tuberculous population, was the very natural thought of those who believe in the transmission of infection between civilized adults.<sup>1</sup> But it appears from a report of M. Godart, of the French War Office, that the statements of Professor Landouzy were not correct(1). Of the 86,000 men, 65,000 had been found tuberculous and eliminated before entrance into the army, therefore did not owe their tuberculosis to army service. Late in 1917, a cablegram

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<sup>1</sup> Landouzy predicts what will occur in the way of tuberculous infection as follows: "The causes favoring the bacillary outbursts will awaken, vivify, then spread abroad, the bacillus of many of the mobilized, the contagion of which when the bearers are discharged threatens to extend over the country as did certain pestilences during the wars of the Middle Ages. From this point of view the war will illustrate in an unheard-of fashion the general pathology of tuberculosis. The first thing that the present campaign demonstrates is that the intense reawakenings of latent microbism are the cause of more or less extended tuberculous endemics for the military groups, as well as for the family. We have to do with an endemic which decimating our towns and country villages has passed into the military groups. Evidently the reawakening of ancient foci has caused squads of bearers of germs who have become sowers of bacilli to mingle with hitherto healthy *poilus*. Thus they have become the cause of the contamination by hundreds of our poor soldiers, till then untouched. Once again the present pandemic affirms the principles of general phthisiology so long established by the French School. From the point of view of a nation in arms in a long and severe campaign the war of 1914-1916 will remain a tremendous episode in the history of tuberculosis." (Paris Médical, 19, 1916, p. 59.)

from the French War Ministry stated that at that time it was believed that less than 50 per cent of the group of 86,000 men were really tuberculous, which figures probably understate rather than overstate the truth. Rist found that only 193 men out of the first thousand sent to a clearing station had active tuberculosis and believes that less than 20 per cent of the 86,000 were really tuberculous and adds, "My personal impression is—much less than 20 per cent(2)." In Germany, too, tuberculosis was diagnosticated too freely. Fraenkel reports in 1916 that of soldiers considered tuberculous only 40 per cent were really so, 40 per cent had other diseases, 20 per cent no disease at all(3). And Blümel found about 80 per cent not to be tuberculous among a group of officers and men examined by him who were supposed to be incapacitated for service on account of tuberculosis(4). Similarly, Wilmanns reports for the German institutions corresponding with the "centres du triage" of the French army, the so-called "Beobachtungs abtheilungen," that of 1,000 soldiers who passed through one of those stations in 1917, 393 were tuberculous, 369 had other diseases, and 238 were healthy. Of the 393 tuberculous patients, 335, or 85.3 per cent, were thought to have had tuberculosis before the war(5). Heinicke, writing in 1918, says that of the last 2,000 cases at the station at Heidelberg 61.3 per cent were found to have no tuberculosis. He goes on to remark that doubtful changes in respiratory sounds, ill-defined accessory sounds and rightly, or wrongly, assumed "shortening" of the percussion note have contributed to make the diagnosis of tuberculosis; "whereas, only unmistakable râles are characteristic of tuberculosis"(6).

It was soon noted in our army that many of the cases returned from Europe as tuberculous had no active tuberculosis. To remedy this condition Lieut. Col. G. B. Webb was sent to France as a tuberculosis expert. Through his influence three hospitals were set apart as diagnostic centers for tuberculosis to which all patients were ordered to be sent for a confirmation of their diagnosis before embarking for this country. Those measures very quickly reduced the cases of erroneous diagnosis to a minimum. After the armistice was signed, however, the need for men abroad no longer existing, the tuberculous cases were again sent directly to the transports and it became necessary to order that upon arrival in the United States patients supposed to be tuberculous should be sent to the nearest tuberculosis hospital for a determination of their diagnosis before arrangements were made for their final distribution for hospital treatment. The total number of admissions to tuberculosis hospitals in the United States up to January 1, 1920, is 18,713. In these the diagnosis was not confirmed in 4,305. How many of these erroneous diagnoses were found among the 8,717 tuber-

culous cases received from Europe is not known. In England also complaint has been made that many cases diagnosticated tuberculosis were really not tuberculous. I am unable, however, to furnish statistics with regard to this point.

So far as we are able to determine the facts, it would seem therefore that the official attitude and the weight of professional opinion in France, Germany, the United States, and probably England, were opposed to the diagnosis of tuberculosis on slight and supposedly early indications. In Italy, however, where the view of the contagiousness of tuberculosis has always been held, the authorities were most strenuous in seeking the elimination of every man with regard to whom there could be the slightest suspicion of the existence of tuberculosis. Cured lesions of bone, relics of glandular lesions, the history of a past pleurisy, the existence of "relics of pleurisy," that is, the slightest determinable pleural adhesions or sclerosis, "no matter how partial or limited," the fact that the soldier came from a family known to contain cases of open tuberculosis, or one in which a death from tuberculosis had occurred, or the conformation of his thorax, or the impression derived in any other way that the individual was, or might be, subject to tuberculosis, all constituted sufficient grounds for sending the soldier to the diagnostic centers, like the "centers du triage," which had been instituted. In fact, all men who had a history of past pleurisy or who had relics of pleurisy were to have been absolutely rejected at the initial examination. A sufficient number of acute diagnosticians being given, it would seem, therefore, that the Italian army could have been nearly wiped out!

Such a fate may have been averted in part by the action of medical officers who were not in sympathy with this exceedingly rigid view as to the dangers of past tuberculous infection, for Maragliano, in his authoritative position as senator of the kingdom and consultant for the army about Genoa, calls upon medical officers to sacrifice their personal opinions in matters of public interest in conformity to existing orders and says that the nation and the government wish absolutely no tuberculous man retained in the service, not one(7)! One of the difficulties that may arise in this method of exclusion is that, diagnosis on suspicion taking the place of physical diagnosis, as it inevitably would to a considerable extent among the less expert examiners (Zanaboni(8) speaks of the need of better instruction of medical officers in tuberculosis), the tuberculosis of the apparently robust which is apt to be of acuter type than that of cases of longer duration would fail of detection. However that may be, it does not appear that tuberculosis was excluded from the Italian army, for Faguioli complains in 1919 that notwithstanding the numerous circulars men with active tuberculosis are often sent



direct to the front and that the tuberculous with positive sputum are returned from the front directly to their homes(9). Active and manifest tuberculosis therefore prevails in the Italian army. Physical diagnosis is essential for the successful handling of the disease there as it is everywhere!

We have therefore, on the one hand, a group of nations in which only active cases of tuberculosis are excluded from the army and, on the other hand, one nation, Italy, in which no suspicion of tuberculosis is tolerated among the soldiers. It is much to be regretted that we are left to conjecture the precise condition of the Italian army as to tuberculosis. That all did not go well with it is, however, sufficiently shown by the anxiety of the authorities and by the numerous circulars. But, while we cannot make comparison statistically, much can be learned from the experience of Germany, which is not only the extremest case but also the one with regard to which the most facts are obtainable. The need of men caused the German authorities to disregard such danger as may exist from the presence of tuberculous men in the ranks and to provide only for the exclusion of cases of active tuberculosis. The Medical Officers' Guide for Determination of Fitness for War (*Kriegsmusterungs-anleitung*), published in 1916 by the German War Office, says that findings deviating from the normal in the apices of the lungs only show unfitness for service when phenomena such as emaciation, fever, cough, expectoration and distinct râles indicate a fresh, or a not yet arrested lung affection, but inactive pulmonary tuberculosis is not regarded as contraindicating military service, nor is treatment in a sanatorium for pulmonary tuberculosis, though taken more than once.

The Guide for the Determination of Pulmonary Tuberculosis from the Standpoint of the Army Medical Officer (*Richtlinien für die militärärztliche Beurtheilung der Lungentuberkulose*), published by order of the Medical Department of the War Office of August 2, 1917, while it does not insist so particularly upon the presence of râles, being intended more for use with the already enrolled soldier than with the recruit, otherwise does not deviate materially from the standpoint of Circular No. 20 of the Surgeon General's Office, U. S. Army, dated June 13, 1917. It is interesting to note that the Germans, after three years of warfare, felt the need of a standard in the diagnosis of pulmonary tuberculosis and provided one which is very similar to the one furnished our army almost at the outset of our participation in the war and published almost two months before the appearance of the German Guide.

It was not intended that in our army should be included any soldier who had well-marked pulmonary tuberculosis, whether manifesting

activity at the time of enrolment or not. The German orders permitted the acceptance of manifest tuberculosis, provided that it appeared to be arrested at the time of examination, without specifically limiting the size of the disease process. The result of this ruling must have been that many cases were accepted which were likely to become active at any time and to develop a positive sputum. Professor His in his Berlin address of 1919(10), comparing the field army with the army before the war, states that the former comprised reservists, men of the Landwehr and Landsturm, youthful volunteers and, towards the end, men of eighteen and nineteen years who had been previously rejected, in general a much less carefully selected material. If the infection of tuberculosis did not spread through the German army, it was not therefore for the lack of opportunities to come in contact with the disease. If infection occurs between adults, the fact should have become apparent in the statistics of the German army in an increasing incidence of tuberculosis. No such increase, however, occurred; on the contrary, there was a remarkable diminution in the amount of tuberculosis in the field army as time went on. His says:

In the first year of the war very competent specialists pointed out the danger of tuberculous infection to which the combatant troops would be exposed from overcrowding in close quarters, from dirt, irregularity of eating, bad weather, overfatigue and psychic depression. *Experience has taught us otherwise.* As early as 1915, astonishment was expressed by many at the slight frequency of tuberculosis in the field army. Those observers based their opinion upon impressions derived in hospitals and upon estimates. But today we are in the position to deal with statistics and to pursue the inquiry to the last year of the war.

He exhibits charts, one of which shows graphically the diminution of tuberculosis in the field army from year to year. In a second chart he compares the incidence of tuberculosis in the Crown Prince's army before Verdun and in the army on the Russian front.

The former was massed together before Verdun in 1916. The troops were for the most part quartered in the notorious French galleries, those tunnels in the rock the filth and narrowness of which defy description and from which on account of the constant bombardment it was often impossible to emerge for days at a time. The Russian army, on the other hand, lay stretched out in the Pripjet marshes in sometimes swampy but sufficiently roomy quarters, often in bivouacs. The curves of the two armies are almost identical and the annual average of cases is somewhat greater in the army on the Russian front.

Von Schjerning, the Surgeon General of the German field army, reports a steady diminution in the incidence of tuberculosis in that army from year to year(11), "the ratio per thousand of mean strength having

been in the first year of the war, 1914-1915, 2.8; in 1915-1916, 1.7; in 1916-1917, 1.1; and in 1917-1918, 0.78." Similarly, admissions for tuberculosis declined sharply in our army in the later months of 1918, a time when no new troops were being enrolled.

These results are not favorable to the theory that the consumptive is a source of danger to his comrades. Two objections might be raised to this deduction; first, the opportunities for infection, in the German army, at least, were too few to influence the general statistics; second, the health of the soldiers was so fortified that they could not become infected. With regard to the first objection, it is true that in the continental armies, unlike our own, I regret to say, the difficulty with the diagnosis of tuberculosis is in the direction of finding too much rather than too little. Goldscheider, for example, says that the overlooking of slight manifest conditions seems rarely to have occurred in the German army. However, not only were many tuberculous men deliberately enrolled who might have become, and no doubt often were, open cases, but it is also a fact that the most advanced tuberculosis sometimes ran its course in the German army without detection. Thus, Oberndorfer, reporting on autopsies in the field, says that he found in two cases of fatal gunshot wounds severe cavernous destruction of the lungs, the men having done duty to the last; likewise subacute peritoneal tuberculosis in a man killed by a grenade, another case of the same disease in which death occurred from the rupture of a tuberculous abscess and a case of severest genito-urinary tuberculosis(12). Where such severe cases can escape attention we may assume *a fortiori* that many less marked but infectious cases will long remain unnoticed under the pressure of active military operations. While the consumptive who has tuberculosis on his mind may call attention to his case, other men, more robust in appearance, but attacked by acuter forms of the disease, not knowing what is wrong, disregard their symptoms and escape detection until some other condition brings their cases to the attention of the medical officer. The better soldier the man is, the more likely is this to happen. I have known of similar cases in our army in time of peace.

With regard to the second objection, the view that health prevents infection with tuberculosis—a very dangerous view in my opinion—is not in accord with our experience in other disease as contagious as tuberculosis has been shown to be in the unprotected and is shown very distinctly by the facts of the primary tuberculosis of the adults of primitive tribes to be incorrect.

The experience of the best clinicians has led them to believe that tuberculosis is not disseminated under the conditions of army life.

Sir William Osler says that the tuberculous soldier brings his disease with him into the army(13). Much says that reinfection with tuberculosis proceeds not from without but from within, "a fact recently fully established by observations of the tuberculosis of soldiers"(14). Schroeder says that a tuberculosis primarily originating in the field has not come to his attention(15). De la Camp(16) and Leschke(17) express similar views. Beitzke, writing in 1920, finds no support in his material for the view that there are many exogenous infections with tuberculosis under war conditions, admitting only the possibility, not the certainty, that some of the cases have recently been infected from without(18). Some, it is true, who are perhaps unduly impressed by the acuity of the tuberculous arising in an army from which the chronic cases of tuberculosis have been eliminated and who possibly attach too great importance to an anamnesis negative for tuberculosis, believe that they find evidences of fresh exogenous infections. But lack of time forbids further discussion of this subject.

It has often been remarked that there was no tuberculosis problem in our army in France. Glomsett, for example, says that it was a pleasant surprise to learn that tuberculosis has played so insignificant a rôle, only 2.5 per cent of deaths having been due to it(19). Richard Cabot, writing from Base Hospital No. 6 at Bordeaux, states that tuberculosis was of rare occurrence at that hospital and that it occurred chiefly among soldiers who had not been especially examined in the training camps of the United States with reference to its presence. The incidence of tuberculosis was greatest, he says, in the early months(20).

That is, the tuberculous soldier had not been eliminated from the army of Pershing. He had brought his tuberculosis with him into the army. As the strength of the American forces in France increased, the earliest contingent would become a progressively less important percentage of the whole. Supposing that the later troops had been better examined for tuberculosis, we should expect a diminishing percentage of incidence, a diminution at first due to the progressive elimination of tuberculosis in the earlier contingent, at a later time due to the fact that few, if any, cases of manifest tuberculosis were arriving from the United States. But if the view of the contagionists is correct, there would be ultimately a very considerable increase in the absolute number of tuberculous cases from infections from without. Cabot states in the report referred to, which covers the period from September, 1917, to November 22, 1918, that there were 63 cases of tuberculosis among 21,738 patients received at Base Hospital No. 6, during this period, 12 of which were found post mortem, also that there were 100

cases which were diagnosticated as probably, or possibly, pulmonary tuberculosis, no other diagnosis seeming more likely, although the sputum was negative. None of the 163 cases, he says, were apparently incipient. Now, in the first 7,000 cases there were found 35 out of the 51 positively tuberculous cases, while in the last 6,000 cases but one was proven tuberculous. There was therefore a very distinct diminution in the incidence of tuberculosis as time went on.

The boards engaged in the examination for tuberculosis previous to demobilization found 1,356 men tuberculous in a total of 2,500,662 men, or 542 per million. This is a small ratio, which, it appears, might have been still further reduced if all the men had been previously reexamined. For from the very valuable report of Maj. R. C. Matson(21), it appears that of the 63,575 men examined for demobilization at Camp Lewis, Washington, 8,500 men not previously examined by any board furnished 57 cases of tuberculosis, or about 6,700 per million, while among 55,075 men previously reexamined at Camp Lewis there were but nine cases of tuberculosis, or 163 per million. Major Matson also reports that, of 183 patients received at the Denver tuberculosis hospital who belonged to organizations from the Pacific coast and the neighboring inland states, 170 were not mustered at Camp Lewis. Nine came from Camp Lewis but were not examined there, having been sent away before the examinations were instituted and, of the four remaining patients of the total of 13, one had been recommended for discharge by the board but not discharged, so that there were but three cases for which the Camp Lewis board could in any way be considered responsible.

Assuming that the demobilization figures at Camp Lewis represent the actual tuberculosis situation in the command—and I know of no camp where the work has been more carefully and efficiently done—and that no errors were made in the first examinations, we may say that .016 per cent is the percentage of men of a properly selected group who will develop for the first time signs of a manifest tuberculosis after approximately one year's service under fairly good hygienic conditions. This is far below Cornet's unavoidable percentage of tuberculosis in army service. The ratio of tuberculous cases in the total number examined for demobilization being 542, the difference, 379, represents the number of men per million who should have been eliminated at the outset, a part of these men, no doubt, having undergone no examination. The percentage found in the reexamined men at Camp Lewis is so trifling as to exclude the probability of exogenous infection in the service.

The Germans were astonished at the manner in which men known

to have manifest tuberculosis endured the hardships of campaign. The strengthening of the constitution by a life, even though it be a life of hardship, which is spent month after month in the open air day and night is a phenomenon of which not even the phthisiologists have apprehended the importance. Shall we therefore say that our attempt to exclude all distinctly manifest, though apparently arrested, pulmonary tuberculosis went too far? I think not, for the reason that the tuberculous individual, as a rule, cannot be depended upon as a soldier. There are exceptions, of course, men who are only too willing to serve to their own injury, but perhaps as a rule the tuberculous are prone to make capital of their known disability. It is very easy to allege weakness or pain in order to escape unpleasant duty, and, sooner or later, the man who is tired of the service will find someone who will give him his discharge. Zadek states that, of 109 soldiers who gave evidence of a tuberculosis manifest before the war, 25 were discharged for tuberculosis in their first year of service from garrison troops and 56 from troops in the field; in the second year of service 8 were discharged from garrison troops and 16 from troops in the field, so that but 4 men remained to be discharged in their third or fourth year of service (22). The experiment does not therefore appear to have been an unqualified success even in the German army where unnecessary discharge is so rigorously guarded against.

In estimating the importance of tuberculosis as a war problem we must be on our guard to distinguish between the new incidence of a manifest tuberculosis as a result of service in war and the discovery of physical signs which have long existed and may point only to a more or less obsolete process. At Camp MacArthur, for example, at Waco, Texas, the admissions for tuberculosis were 23 in October, 1917; 119 in December, and 137 in January, 1918. They rose again from 38 in May, 1918, to 124 in June and 143 in July, and in November reached the height of 360. Assuming a homogeneous and permanent command from which tuberculosis had been eliminated at the outset, such fluctuations would be hard to explain except as veritable little epidemics of tuberculosis, the result of army conditions. But the facts were that one division first organized there moved overseas in February, 1918; that after this division had departed another division was organized and that during 1918 recruits were sent to this camp in thousands. The composition of the command, therefore, was constantly changing. The examinations of newly arrived recruits, and especially the activities of boards for the reexamination of the command and for demobilization, account largely for the fluctuating admissions for tuberculosis, many of the men concerned, no doubt, having been upon full duty and not knowing that they had tuberculosis until the disease was found by

the examining boards. There are no grounds here for an alarmist view as to the development of tuberculosis on the spot.

How many of the discharged soldiers who under existing legislation are entitled to relief through the Bureau of War Risks incurred their pulmonary tuberculosis as the result of their military service is an interesting question.

Before the late war medical officers were required to certify with regard to discharges for tuberculosis, as for other disabling causes, whether or not the disability was incurred in line of duty, that is, whether it was pensionable. This practice was kept up during the first months of the war, and every effort was made to examine the newly mustered soldiers at so early a time that it could be determined with practical certainty that such chronic pulmonary tuberculosis as might be found could not have developed for the first time in the course of the military service of the individuals in question. Table 73, page 158 of the Report of the Surgeon General for 1918, gives the discharges for disease under two rubrics, "in line of duty" and "not in line of duty." The discharges for tuberculosis in line of duty numbered 349; not in line of duty, 3,327—that is, the tuberculosis found incident to the service was to the tuberculosis brought into the service, roughly, as one to ten. In reality the proportion of the former was probably much less than one to ten.

But all of the care to protect the pocket of the taxpayer was rendered futile by legislation. The present law under which the benefits of the Bureau of War Risks are bestowed provides that compensation shall be given all members of the military service who suffer disability "from disease contracted in the line of duty, provided that the disease has not been caused by their own wilful misconduct, that for the purpose of compensation all such persons shall be held to have been in sound condition when examined, accepted and enrolled for service, and that these provisions shall be deemed to become effective as of April 6, 1917." That is to say, every man accepted by local boards, or by any recruiting officer from the beginning of the war, is entitled to compensation when shown to be tuberculous, even though he had been rejected physically on the day when he presented himself at camp. Such legislation is always to be expected in a democracy when large bodies of men are concerned. The only remedy against its evils for the taxpayer appears to be better education of the medical profession and a more adequate regulation of the activities of those who have to do with the primary examinations. No one can esteem more highly than the writer the qualifications, industry and unselfish patriotism of the great majority of the members of the local boards, but no doubt many of the best of the physicians of these boards

would be the first to disclaim any expert knowledge of specialties like tuberculosis. While the service rendered by most is worthy of high praise, there can be no doubt that some local boards have either been negligent of their duties toward the Government or have conceived of those duties in an unusual way, to say the least. Major Matson, for example, remarks that at Camp Lewis "the material was largely from the southwest and contained enormous numbers of healthseekers whom the boards of the first draft sent, thinking that a change of climate might benefit the manifestly tuberculous"(21). This remark undoubtedly applies with even greater force to Camp Kearney (near San Diego, California), the tuberculosis statistics of which are much the worst of all of the camps of the United States.

The most extraordinary condition, however, was revealed at Fort McArthur, California. In five howitzer companies, among 501 men examined, 103 cases of pulmonary tuberculosis were found, a rate of 20.55 per cent. The large majority of these men were drafted men from Texas, 53 towns of that state having contributed 92 of the tuberculous cases. Such a percentage does not, of course, fairly represent the prevalence of tuberculosis in Texas. The town consumptive was sent along, no doubt, with the rest of the boys from each town, whether from motives of mistaken benevolence or for other reasons. When a commanding officer was called upon to furnish men to other organizations he would naturally rid his own command of its worst physical specimens. So it came about that after one or more transfers of this kind the fort at San Pedro became, as it were, the sieve upon which were collected the consumptives of Western Texas! One would prefer to conceal such facts out of shame. They are mentioned in this connection in order to impress upon your minds the fact that the compensation given by a grateful people is not bestowed solely upon those who have sacrificed their health in the service of their country and above all the fact that the statistics as to the prevalence of tuberculosis in our army do not at all represent the incidence of tuberculosis in the military service.

#### SUMMARY

The experience of the principal nations engaged in the late war gives little, if any, support to the view that it is necessary to take account of minute and obscure physical signs and symptoms in order to diagnosticate pulmonary tuberculosis.

There is no trustworthy evidence that tuberculosis is communicated from man to man in our civilization under military conditions.

On the contrary, the experience of our army shows the remarkable fact that if the men who bear signs of a present or past manifest tuberculous affection of the lungs are eliminated by a rapid physical examina-



tion, the army is practically freed of pulmonary tuberculosis. In other words, those who will break down under the conditions of military service are in very large measure those who bring their tuberculosis with them into the service in a form detectable by the ordinary physical examination of the lungs.

#### SUPPLEMENTARY REMARKS

These conclusions do not take into account the deaths from tuberculosis in the service nor the discharges for that disease, for the reason that under the conditions they do not represent the incidence of tuberculosis in the military service. The fact shown in the foregoing discussion that the ratio of tuberculosis found increases directly with the percentage of unexamined troops shows clearly enough that the more chronic forms of tuberculosis were, as a rule, of pre-war origin. The ratio of deaths from acute military tuberculosis in 1918 in over 2,000,000 troops was .03 per 1,000 and for "tuberculosis others" was .05 per 1,000. It is under these rubrics that deaths from acute primary tuberculosis are most likely to be placed.

But military forms are usually secondary to an old infection, and there is no good reason for any other assumption as to our army. The same remark applies to "tuberculosis others" which refers to extra-pulmonary tuberculosis.

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# STORY OF A MILITARY SURGEON OF THE BATTLE OF BORODINO, 1812

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NUMEROUS accounts of Napoleon's Russian campaign have been written. Besides Count de Ségur's history we have the accounts of General Marbot, Colonel Griois, Captain Coigné, Sergeant Bourgogne and many others. All these writers relate their personal experiences. The medical side of this tragic campaign has been less fortunate. Besides the account of Surgeon General Larrey we have only the book of Chief Surgeon Henry von Roos, "With Napoleon in Russia."

Of the 450,000 men of Napoleon's army only about 220,000 were Frenchmen; the others were Italians, Germans, Dutch, Spaniards, Portuguese, Austrians, Poles and Swiss. Von Roos was chief surgeon of the 3d Württemberg Cavalry regiment which belonged to the 2d Corps under Murat. He accompanied the great army to Moscow and was present at most of the battles. On the tragic retreat he was captured by the Russians at the passage of the Beresina, but being a surgeon, he was well treated by his captors, who needed his services. After the war he remained in Russia and practiced medicine in St. Petersburg. In 1832 he published his book: "With Napoleon in Russia."

From the very interesting book we select the chapter on the battle of Borodino, one of the greatest battles of the nineteenth century, in which Napoleon's army lost 30,000 and the Russians 50,000 men in killed and wounded.

We mounted our horses at the first dawn of this memorable day. Neither men nor horses had breakfast. We moved to the right and took position behind a wood which was filled with our infantry. On the other side of this wood was the left wing of the Russian army, which was protected by a large redoubt. It was still very early; everything was quiet; the sun had not yet risen. The command was given to dismount. The cold morning induced our soldiers to cut off branches of the nearby juniper bushes and to make fires. The smoke rose straight up into the sky, which we jestingly pronounced a favorable omen for the day. The morning grew brighter. We mounted our horses, and now the famous order of the day was read by the adjutant, Count von Gravenitz. In his zeal and excitement he read, instead of "On the Moscowa," "Moscow, September 7th, 1812. Napoleon."

In the meantime the sun had not only risen but the battle had begun. In front of the wood behind which we stood, a great cry arose, which, in spite of the thunder of the heavy guns and small arms, was so loud and distinct, as if all the languages of Europe were spoken at once.

At least we heard on our horses several known and unknown languages. This lasted about fifteen minutes. Then all was still, very still, from which we concluded that something decisive had happened. The first redoubt on our right wing had been taken by our troops under Marshal Ney, which were composed of Frenchmen and my countrymen and of Poles under Poniatowsky.

Our position was without danger. Not a single ball seemed to have touched the wood. The beginning of the battle was therefore only a treat to our ears.

But soon things became more serious. We were ordered to move to the left, but we remained outside the reach of the guns on our march. The battle had now begun on the whole line. A noise like thunder and earthquake was heard on all sides. We trotted along behind many regiments ranged in lines until we again took position in the centre of the battle line, opposite the great central Russian redoubt. Behind us stood the Imperial Guard, ranged in a dense column. This column kept its position during the whole battle without firing a shot and without a man being wounded. A division of Prussian artillery was attached to it.

When in the course of the battle the infantry, assisted only by the cuirassiers, made several attacks on the Russian centre, the projectiles of the enemy flew over the lines of our light cavalry and but rarely hit a man.

In the meantime I had selected, behind the front of our troops, a place for my work, which could hardly be more desirable for a military surgeon. A small hollow, traversed by a little creek bordered here and there by bushes, was the place for me, my assistants and our horses.

At first I had time to go nearer and watch the terrible scene. But the humming and whistling of flying balls soon induced me to suppress my curiosity. They soon began to lead or carry to our station officers and privates, Saxons, Westphalians, Frenchmen, Württembergians and sometimes also Russians. All the wounded were mostly cavalrymen with severe wounds and fractured limbs. I could say much about these wounded men and their strange injuries as well as on the behavior of these men while we attended them but this would lead me too far. I will mention only a few things. A cuirassier of the Saxon Guard of unbelievable height had the muscles of his left thigh torn away from the knee to the buttock and down to the bone by a piece of shell. The hanging muscles and skin flaps formed a terrible wound, but it did not bleed. It is a fact that lacerated and crushed wounds bleed little on account of the paralysis of the ends of the blood-vessels. Even arteries do not bleed often. But wounds caused by cutting arms always bleed profusely. This giant Saxon had as much courage as he was tall. "My wound is large, indeed," he said, "but it will soon heal up, for I am a healthy man and my blood is good." Less confidence and courage was shown by a young officer of the same regiment. He was small, of a fine and delicate build, and seemed to belong to the higher nobility of his country, for he showed an excellent education. A gunshot had pierced one of his deltoid muscles. As restless as he was he did not complain of pain, but he was angry to have been wounded, to perhaps become a cripple, to have lost his horse and mantle and to be so far from home. His questions awakened my pity, and I would gladly

have turned him over to his mamma if Borodino had not been so far from Dresden.

Generally the French wounded were calm and patient, and several died of severe injuries from cannon balls before their turn came to be tended to. On the other hand a Westphalian reviled and cursed Napoleon and his brother and regretted not being able to take revenge.

At noon the number of wounded in our hollow grew so great that we could foresee that we would have work until evening. But several surgeons came to help us, and with their assistance we attended a great number of wounded. Many of these died at the dressing station. Wagons were brought to carry the wounded away. Those of our regiment were carried to our camp, others were transported to the large monastery which lay far behind the battlefield, others again were brought to the neighboring villages. Unlike in other campaigns the surgeons were not assigned places for collecting the wounded.

While we thus performed our bloody work in this hollow and while, during our work, we frequently washed our hands and instruments in the nearby creek, many heavy Russian cannon balls flew over our heads. Some bored themselves into the slope behind us; others rolled down the incline in front of us. A temporary calm in the cannonade caused me to wonder what was going on in the front. I climbed the incline and found that our troops had changed their position in such a way as to indicate that the battle took a favorable course for us. On the whole line the firing of cannon and small arms continued and the adjutants galloped in all directions, but only a few balls reached the region where we were. Not more than thirty steps from me, to the left, I saw the French division general Montbrun, well known to us all and esteemed and loved by everybody, suddenly turn pale and sink from his horse. As rapidly as I ran up to him I was not the first to get to him. Two French surgeons were nearer him and reached him first. We found that a piece of shell had wounded him mortally in the gastric region. The large lacerated wound bled little. The general turned pale and yellow rapidly. His eye, usually so bright and fiery, became dull. But with a few faint words and with signs he could still indicate that he wished to be carried where he had passed the last night. There he died, in the shade of a house near our camp at 5 o'clock in the evening.

The skill and rapidity with which the French soldiers made a litter bordered with green beech boughs to protect him from the sun and the touching manner indicating their high esteem pleased us all who came near to show our sincere compassion.

I then returned to the hollow to continue my work with my colleagues. The number of wounded was now less large than a few hours before, for in the meantime the second great redoubt in our front had been taken and the battle moved slowly to our left, where the Italian army stood. The wounded who arrived told us of the most terrible scenes they had witnessed at the repeated attacks on the central redoubt; they told of the piles of dead in and around it and of the stubbornness of the attack and defense. They said the redoubt had already been leveled and that the dead bodies had been covered with the earth of the intrenchments.

In the meantime Napoleon rode with a large suite right through our

dressing station. His slow ride seemed to indicate calm and contentedness with the course of the battle for we had not yet learned to interpret his grave features, for in good and ill fortune and under all circumstances he presented the same picture of cold calmness which knows no kindness.

Decimated regiments, crippled gun carriages, officers and soldiers of various nationalities who had lost themselves passed our dressing station. The light Württemberg cavalry regiment of Duke Henry also passed by. It was so much reduced in numbers that we counted only three officers and twenty men.

The lower the sun now sank in the west the less the fighting grew on our left and centre, for the Russians had now concentrated all their forces on their right wing where they stubbornly defended their third redoubt against the Italian army. Attack and defense were carried out with greater spirit and louder thunder of the heavy artillery than was the case with the two first redoubts, until finally the silence of the Russian guns on the redoubt convinced us that it had been taken.

My colleagues and I had left the hollow. We found our regiments drawn up in short, decimated lines. The men complained of the loss of their friends, and they asked us about the condition of the wounded. Where we now stood the battle was over. The adjutant wrote his report of the losses on the back of a soldier. But near the village of Gorky the Italian army was still fighting fiercely. The fighting lasted until night came on and the Russian army retreated through the forest in its rear.

We surgeons found still plenty of work, and the wounded we did not find were shown us by compassionate officers. Thus an officer led me to a severely wounded Russian noncommissioned officer of artillery who lay in an excavation of the ground made by a heavy cannon ball. Both his thighs had been crushed by a ball. The young man, from Courland, of good family, betrayed education and spoke French and German fluently. The officer begged me to dress the wounded man. The latter did not seem to care much himself. He had a strong mind and bore his sufferings with great courage. When I examined him and told him that any motion of his legs would cause new haemorrhage, that dressing the wound would cause new pain, that the darkness of the evening made ligation of the vessels impossible, that for an amputation the injury was too close to the pelvis, etc., he assented with a sigh. We covered him with his mantle, bade him adieu and promised to see him again in the morning.

I was then called to a rifleman who had received a thrust with a pike from a Cossack in the inner angle of the eye, and so deep and powerful was the thrust that the eyeball was torn from its cavity and was hanging from the orbit with muscles and optic nerve still intact. The man could walk but complained of pain. The eyeball was not soiled with earth. After I had washed and cleansed it with water I replaced it with a few manipulations, put a cold compress and bandage on it and had him carried to the other wounded. I have never heard of him again.

Generally pike thrusts are rarely dangerous. They cause light wounds and merely injure the skin and muscles, unless they are inflicted

with great force. But more important and generally dangerous to life are lance thrusts, because they stab and cut at the same time. They penetrate the cavities of the body, injure vital organs and blood-vessels and frequently cause death. A hussar received a lance thrust in the right thigh, posteriorly near the buttock. He was brought to me sitting on his horse. His drawn features, his pallor, his dull dying eye revealed to me at first sight an injury of a vital organ and approaching death. Before he was lifted from his horse and the wound exposed he was dead. The deep stab wound had penetrated the posterior portion of the thigh and was at its entrance an inch and a half wide. The lance had cut through the sciatic nerve, of which I convinced myself by widening the wound.

In the meantime night had come and all was quiet on the battlefield. The regiments rode to their camping places whence they had started in the morning. I found my wounded lying around the fires well cared for and comfortable. As great as was the general want, some food had been prepared for them. I had not eaten anything the whole day except a small piece of bread which Chief Surgeon Barchet handed me. Besides this I drank only water at the nearby creek. At the camp I now got a little food, but far too little to appease my hunger. The horses had to be left bridled. Hunger made them restless. Mine and many others ate the ripe flax of the field which they pulled out of the ground with its roots.

The night had passed. I had slept at the fires of our wounded and got up very early. The stillness and the bright morning induced me to go over the battlefield where the infantry was encamped. I turned to the left, and as the sun cast its rays on the great number of living and dead I was already on top of the redoubt which the Italian army had taken the evening before. I there found the Viceroy with a few adjutants, wrapped in their mantles, standing around a fire, which was made from a capsized Russian gun carriage. I was told that the king had spent the night here and that during the night the redoubt had been leveled and that hundreds of dead and half-dead had been covered with the earth.

Far and wide the troops were encamped and innumerable dead bodies were lying about. Among the latter a young Russian attracted general attention. Be it that the first sun rays revived him or that the noise around him woke him up, he sat up in the midst of the dead bodies, rubbed his eyes, slowly got on his feet, looked around and slowly walked off in a direction in which, he thought, he would not be noticed. Nobody stopped him. It was the general opinion and also probable that this young man was stunned and thrown down during the terrible cannonade, perhaps by the close discharge of a heavy gun or the explosion of a shell, and had thus passed the night among the dead.

When I returned to my regiment the order for the march had already been given and all was in a stir. With regard to the wounded we had received orders to transport them to a village behind the monastery and off the great road. An assistant surgeon, his attendant and the men who had lost their horses during the battle were commanded to carry out this order. I rode away with my regiment.

# CLINICAL INTERPRETATION OF FINDINGS IN BLOOD CHEMISTRY

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ANALYSES of the blood by chemical methods, up to a few years ago, have been looked upon as purely physiological, having no clinical use. The American physiologic chemists, led by Folin with his micro methods, have made the analyses of the blood a matter of practical importance, so that today biologic chemistry has a voluminous literature, and new and more exact methods are produced in rapid succession. The technical methods have gone far ahead of the clinical interpretation. This paper is for the purpose of reviewing, for the busy clinician, interpretations which are scattered through the literature.

Blood and urine chemistry are supplementary to each other, but, if only one can be used, choose blood chemistry. Blood chemistry gives to the clinician more serviceable information than urine chemistry and affords information not obtainable by other means. Urinalysis tells only what the organism is excreting, but blood analysis tells what the organism is retaining. Blood chemistry gives a much better insight into the metabolism of the patient and is of more diagnostic and prognostic value than urinalysis. It not only tells what the kidneys are doing but just what they are not doing. Urinalysis reveals something of the organic changes going on in a diseased kidney, but the functional disorders can be diagnosed by blood chemistry. For example, it is not possible to ascertain whether a patient having glycosuria is suffering from diabetes mellitus, renal diabetes or lowered kidney threshold for dextrose, without an estimation of the blood sugar.

Reports from the laboratory are usually given in terms of milligrams per hundred cubic centimeters of blood, more rarely in per cent. The following table gives the upper and lower limits of the several important ingredients sought for by blood analysis. The lower figures will be those found in normal individuals and the higher figures in the average run of hospital patients (these figures are for whole blood and are found in Folin and Wu's method of analysis):

Total nitrogen.....	3.0 per cent		
Non-protein nitrogen.....	25	to	30 milligrams per 100 c.c.
Urea nitrogen.....	12	to	15 milligrams per 100 c.c.
Creatinin.....	0.7	to	2.0 milligrams per 100 c.c.
Creatin.....	5	to	10 milligrams per 100 c.c.
Uric acid.....	1	to	3 milligrams per 100 c.c.
Dextrose.....	80 (.08%)	to	110 milligrams per 100 c.c.
Cholesterol.....	140	to	180 milligrams per 100 c.c.
Chlorides.....	450	to	650 milligrams per 100 c.c.
Carbon dioxide combining power of the blood plasma—77 to 53 volumes per cent			

It is the purpose of this paper (Section A) to give the results found in disease under the headings of the various ingredients and (Section B) to sum up under each disease the picture given by the blood analysis. The clinician, however, must bear in mind that the methods of biological chemistry are making rapid strides and that the same progress is being made in interpretation of the pictures shown by blood chemistry in various diseases and conditions. So, while the interpretations given here are the best to be found in the literature, it is possible that they may be changed as the horizon broadens.

#### SECTION A

##### *Dextrose*

The normal limits are from 0.8 to 0.11 per cent. The renal threshold for dextrose, that is, the point at which the kidney begins to excrete dextrose in the urine seems to be, normally, in the neighborhood of 0.17 per cent. There is a group of persons with a renal threshold as low as 0.14 per cent. These persons may show glycosuria after a high carbohydrate meal. They may be cases of renal diabetes in which the low renal threshold allows glycosuria with a normal dextrose in the blood. In nephritis the renal threshold is usually high, being around 0.20 per cent, but some cases show a low threshold. The cause for this has not been determined. In diabetes mellitus of a mild type there is a low threshold, even under 0.15 per cent, or it may be normal, or even as high as 0.20 per cent. In nephritis, blood sugar usually varies between 0.12 per cent to 0.15 per cent. In diabetes, it is usually above 0.18 per cent and may go as high as 0.24 per cent. The dextrose tolerance test will serve to diagnose many obscure cases. This consists of (1) a blood examination for dextrose; (2) the ingestion of 100 grams of dextrose; (3) the examination of blood for dextrose 45 minutes after the ingestion of the dextrose and the examination of the blood 2 hours after. At each examination a sample of urine is taken and examined for dextrose. The normal individual will show from 0.8 per cent to 0.11 per cent of dextrose before the dextrose is given. In 45 minutes the blood sugar rises to 0.16 per cent—0.18 per cent, and falls at the end of 2 hours to about the amount of the initial examination. The urine examinations are negative for dextrose. In diabetes mellitus, the first reading is from 0.18 to 0.2 per cent and this rises in 45 minutes to 0.2 to 0.3 per cent, and at the 2-hour examination it is usually 0.2 to 0.25 per cent or it may rise still higher. There is dextrose in the urine at the 45 and 2-hour interval periods. The tolerance test gives the clinician a method of determining the renal threshold for dextrose in each case of glycosuria. It will show the mild and severe cases at once and will differentiate the renal diabetic.



The blood dextrose is raised in a few cases of pellagra studied as high as 0.24 per cent. In endocrine disorders a decreased activity of the thyroid or pituitary usually means a decreased dextrose content of the blood and vice versa. The tolerance test shows a low dextrose tolerance after thyroidectomy. In hyperthyroidism there is a hyperglycemia and glycosuria as revealed by the tolerance test. In Addison's disease the tolerance tests shows a marked tolerance for glycosuria. It has been noted that in the first three months of pregnancy there is a lowered renal threshold for dextrose, and this has been utilized to determine the fact of pregnancy.

#### *Urea Nitrogen and Non-Protein Nitrogen*

The urea nitrogen and the non-protein nitrogen will be taken together. The urea nitrogen constitutes from 60 to 75 per cent of the non-protein nitrogen, and the excretion seems to be parallel. So far as has been determined, diseases that cause a retention of urea nitrogen cause a retention of non-protein nitrogen. This, however, is still to be worked out more clearly. The normal urea content of the blood is from 12 to 20 milligrams per 100 c.c. (non-protein nitrogen 20 to 25). In early interstitial nephritis, the urea nitrogen is normal or may be increased slightly to 30 milligrams. In terminal nephritis, it reaches very high levels, as high in some cases as 300 milligrams. The range in parenchymatous nephritis is from 30 to 60 milligrams. The term uremia should be restricted to those patients having a high urea nitrogen content of the blood. In acute nephritis from mercury or arsenic the urea nitrogen is as high as 250 milligrams. Eclampsia, which is supposed to be a retention by the kidney of waste products, shows 10 to 25 milligrams, showing that the retained toxic principle is not urea. In carcinoma, figures ranging from 24 to 58 milligrams are found. Pregnancy gives low figures 8 to 15 milligrams. The examination of blood for urea will differentiate many cases now called cardio-renal, which term should be discarded. True cardiac cases, which are decompensated, give low urea nitrogen figures. Renal cases with beginning cardiac failure will show very high urea nitrogen. Thus a simple examination of the blood will serve to indicate the proper diagnosis, treatment, and finally the prognosis. Myocarditis shows 14 milligrams. The average of many cases of lues gives 43 milligrams but, with an associated nephritis, a rise to 75 milligrams is found. In cases of obstruction of the urine, especially that due to the prostate, the best guide to operation is the blood urea nitrogen. The rule laid down by urologists is: (a) If the blood urea nitrogen is less than 30 milligrams, operate; (b) if between 30 and 50 milligrams, do a preliminary drainage under local anesthesia

and give eliminative treatment; (c) if over 50 milligrams, treat the patient until the urea nitrogen drops to 30 milligrams. Immediate operation is absolutely contraindicated if the blood urea nitrogen is over 50 milligrams.

The prognostic value of the blood urea nitrogen is not high except in terminal nephritis, since it can be easily influenced by the food intake and by eliminative treatment. In combination with creatinin, however we have a useful prognostic formula; i. e., cases with a high urea nitrogen and a low creatinin improve under treatment, but with the urea nitrogen low and a high creatinin value a guarded prognosis must be given.

#### *Creatinin and Creatin*

The normal value of creatinin in the blood is from 0.7 to 2.0 milligram. No special clinical importance is attached, as yet, to the creatin as it seems to follow closely the creatinin figures. Creatinin, being a very easily excreted substance, is the last one to be retained by a failing kidney. It cannot be influenced by treatment. A continued value of over 5 milligrams is invariably fatal. That this is true has been borne out by several hundred cases now on record in the literature. Over 3.5 milligrams means a badly damaged kidney. In early nephritis there is found 1 to 2 milligrams. In terminal nephritis, this rises to from 35 to 70 milligrams. In parenchymatous nephritis, it is from 1 to 1.9 milligrams. In the acute nephritides, like that caused by bi-chloride of mercury poisoning, the creatinin has risen to 35 milligrams but has fallen to normal after a few days. This is the exception that proves the prognostic rule given above. The following is a list of figures found in various diseases: Diabetes, 2.9 milligrams; gout, 2.2 milligrams; malignant disease, 3.0 milligrams; myocarditis, 2.0 milligrams; prostatic obstruction, 2.5 milligrams; pneumonia, 2.9 milligrams; lues, 3.2 milligrams; gastric ulcer, 2.2 milligrams; leukemia 2.4 milligrams.

#### *Urid Acid*

The normal uric acid content of the blood is from 1 to 3 milligrams. Uric acid, being the least soluble of the body waste products, is the first ingredient in the blood to be affected by incipient kidney disease. A slight rise in uric acid is sometimes found before even albuminuria. This is a good point to remember in cases of so-called essential hypertension. In interstitial nephritis the blood uric acid rises to as high as 6 milligrams. In terminal nephritis, it rises as high as 25 milligrams. In parenchymatous nephritis, it averages 2.5 milligrams. In the acute nephritides, the average is 11.4 milligrams. In diabetes, 6 to 7 milligrams is the average finding. In syphilis it is 8 milligrams. Pneu-

monia gives 9 milligrams. In prostatic obstruction, 7.2 milligrams is found.

The status of the blood uric acid in gout is a very unsettled one. The consensus of opinion is that a retention, averaging from 6 to 9 milligrams, is found in gout. This has been disputed by some investigators. There seems to be no marked rise before or during an attack. Fine asks three questions: (1) Is gout an early stage of interstitial nephritis with special characteristic symptoms? (2) Is every case of interstitial nephritis a potential case of gout? (3) Is the uric acid retention due to the gout or to the nephritis which invariably accompanies gout? These questions should be settled in the near future.

#### *Cholesterol*

The normal blood cholesterol value is from 0.14 to 0.18 per cent. In severe diabetes it rises to 0.64 per cent. In the lipemia of terminal diabetes it rises to above 0.6 per cent and even up to 3.6 per cent in one case. In malignant disease there is a rise to 0.2 per cent with a fall later to 0.12 per cent. Pregnancy, from the fourth month, gives high values. Pellagra has given a high value of 0.24 per cent. Cholelithiasis, *per se*, gives values of from 0.13 to 0.22 per cent, but jaundice gives the high figures of from 0.2 to 0.4 per cent. A high figure of 0.34 per cent has been found in nephritis. Anesthesia seems to raise the cholesterol value. The average in eclampsia is 0.23 per cent. Cholesterol decreases in pernicious anemia, and this has led to the treatment of this disease with inunctions of wool fat which has a high cholesterol content. There is, as yet, no agreement in the interpretations of the cholesterol blood findings.

#### *Carbon Dioxide Combining Power of the Blood Plasma*

The normal carbon dioxide combining power of the blood plasma is from 77 to 53 volumes per cent. In terminal nephritis with acidosis, this drops to from 50 to 34 volumes per cent. Diabetes shows no drop in the carbon dioxide combining power of the blood plasma till acidosis is present. Mild acidosis shows from 55 to 40 volumes per cent; acidosis of a moderate degree from 41 to 31 volumes per cent and severe acidosis below 31 volumes per cent. The abnormal amounts of acid waste products thrown into the blood in diabetes are neutralized by the available basic substances so that the carbon dioxide combining power of the plasma is lowered.

In gastro-intestinal disorders, especially in children, acidosis is very common and sometimes rapidly fatal. In pneumonia, in malnutrition and after anesthesia, the carbon dioxide combining power of the blood is greatly lowered. Pneumonia has given a low value of 33 volumes

per cent. In Asiatic cholera, very low values have been obtained. The carbon dioxide combining power of the plasma should be the guide in all cases of diabetes in which Allen's starvation treatment is used. The following table gives the details:

<i>C. D. C. P. before treatment</i>	<i>Give food if gets down to:</i>
77 to 53 volumes per cent.....	45 volumes per cent.
53 to 40 volumes per cent.....	43 to 35 volumes per cent.
40 to 31 volumes per cent.....	38 to 36 volumes per cent.
Below 31 volumes per cent.....	Stop in 6 to 12 hours unless rises.

This plan will obviate the greater part of the danger of coma.

*Blood Chlorides*

Normal value of the chlorides as sodium chloride is from 0.45 to 0.65 per cent. This value is greatly increased in parenchymatous nephritis. In acute nephritis the average is 0.59 per cent and in interstitial nephritis is from 0.58 to 0.69 per cent. The chloride content is greatly influenced by the diet. On a reduced diet, values as low as 0.38 per cent have been obtained. In diabetes, the values range from 0.44 to 0.48 per cent. There is marked retention of chlorides in pneumonia as shown by urinalysis, but this retention is not in the blood. It may be in the consolidated areas. Retention and high blood values are found in fever, heart disease and cancer. Tetany and eclampsia gives about 0.51 per cent. The acute nephritis caused by bichloride of mercury causes a decrease in the chloride content of the blood, the reason for which is not clear. The analysis of the blood for chlorides tells when to feed and when not to feed a chloride free diet.

SECTION B

This section will take up the various diseases and give the blood picture as shown by the blood chemistry.

*Acute Nephritis*

There is a tremendous retention of waste products in the blood in the acute nephritides caused by mercury, lead arsenic, etc. This is not a permanent condition, and the concentration of these products falls as the kidney resumes its function.

The urea nitrogen reaches its highest level in this disease. It may reach 120 milligrams or even up to 200 milligrams. Only in terminal interstitial nephritis is it as high. The creatinin reaches as high a level as 10 milligrams. This is the only exception to the prognostic rule that 2 milligrams or over means a fatal result, the patient probably dying within two to three months. The uric acid content is raised to from 11 to 15 milligrams. The dextrose content has not been noted in this disease. The kidney threshold for dextrose, as discovered by the

tolerance test, has not as yet been ascertained. The cholestrol is high. The carbon dioxide combining power of the blood plasma is lowered especially as acidosis increases. The chlorides of the blood are increased.

#### *Parenchymatous Nephritis*

The most noteworthy feature of this disease is the lowering of the carbon dioxide content of the blood plasma. This falls in many cases as low as 30 volumes per cent as is shown by the air hunger. The urea nitrogen is very slightly increased, averaging from 30 to 50 milligrams per 100 c.c. The creatinin is within normal limits. The uric acid is increased slightly, up to 3.5 milligrams. The dextrose is normal or slightly over normal. The kidney threshold for dextrose may be raised or may be lowered and the chlorides retained, as is evidenced by the marked edema usually present. There is an increase in the amino-acid nitrogen, which may go up to 12 milligrams per 100 c.c. The phosphates in the blood are increased. The cholestrol is increased.

#### *Interstitial Nephritis*

In early interstitial nephritis there may be no change in the blood picture. The first ingredient to be affected is the one that is excreted with the greatest difficulty, namely, uric acid. For a time this may be the only abnormal sign in the blood. This fact gives the clinician an opportunity to elucidate the mystery of "essential hypertension." If in all hypertension cases there is an increased blood uric acid, the kidneys can be looked upon as the primary factor. If the blood uric acid is not increased, we will have to look elsewhere for the cause. As the disease progresses, the next product to be retained is the urea nitrogen and, for a comparatively long time, this is all that can be told by the blood picture. Casts and albumin may be absent from the urine of these patients, especially before the urea nitrogen commences to be retained, or there may be only occasional traces of albumin with showers of casts. The patient at this time complains of only very slight subjective symptoms, or possibly none at all. This is the time for the treatment of nephritis, and blood chemistry will help to discover these cases and so prolong the life of many of the patients.

The disease progresses and the retention becomes more marked, but as yet in the uric acid and the urea nitrogen only. Casts and albumin appear in the urine regularly, and the patient becomes slowly worse. Finally the terminal stage appears in which all the other ingredients are retained in addition to the rising uric acid and urea nitrogen. Creatinin begins to rise, and when this reaches 3.5 milligrams the kidney is quite badly damaged. The urine chlorides decrease and the specific gravity becomes fixed. The blood dextrose and cholestrol are increased.

In the terminal stage the following figures are found: urea nitrogen, 200 to 300 milligrams; creatinin, 5 to 35 milligrams; uric acid, 15 to 25 milligrams; dextrose, 0.2 per cent, probably because of the high kidney threshold. The cholesterol is very high. The phosphates are increased due to the acidosis present. The carbon dioxide combining power of the plasma is decreased down to 25 volumes per cent. The blood chlorides are increased up to 0.7 per cent. The amino-acid nitrogen is increased to 30 milligrams. Ammonia nitrogen may be found.

The prognostic substance is the creatinin. The urea nitrogen and the chlorides can be lowered by treatment, but the uric acid and the creatinin can be only slightly influenced, if at all. The clue to the diagnosis in nephritis is given by the uric acid, but the creatinin gives the prognosis.

A patient entering the hospital with ascites and edema of all parts of the body with casts and albumin in the urine, and heart murmurs of various kinds, can be diagnosed by blood chemistry and put on proper treatment immediately. Cases which have a primary heart lesion show none of the retention of uric acid, urea nitrogen and creatinin that the primary kidney lesion show. This method relegates the term "cardio renal" to the rag bag. If urea nitrogen is high and creatinin low, we can treat the case with some expectations of improvement. If the reverse is present, treatment is of very much less avail.

### *Diabetes*

This is the disease that, in spite of all our researches, remains a mystery. The crux of the situation seems to be the non-utilization of the dextrose by the body tissues. The disease is not glycosuria nor the hyperglycemia, but the inability to use dextrose. The cause of this inability is still a mystery, although the pancreatic secretion is said to be at fault. Diabetes cannot be diagnosed or treated except as the course of the disease is followed by blood chemistry. As far as we know, diabetes is hyperglycemia plus an occasional glycosuria, plus the clinical signs and symptoms. The normal dextrose content of the blood is from 0.08 to 0.11 per cent. It rises in diabetes to 0.15 per cent or even up to 0.30 per cent in early cases. There may or may not be glycosuria with these figures depending of the renal threshold. In mild, early diabetes, the kidney threshold for dextrose is normal—that is, about 0.17 per cent. As the case progresses, the renal threshold falls to as low as 0.12 per cent and rises again in the terminal stages up to 0.20 per cent or even to 0.30 per cent. The threshold is determined by the glucose tolerance test (*vide* Section A). The treatment in diabetes should aim, not at the abolishment of the glycosuria but at the

reduction of the hyperglycemia to a normal dextrose level. This, of course, is to be accompanied by the gradual building up of the dextrose utilizing powers of the body tissues. The urea nitrogen in this disease remains within normal limits till the end is near, when it may rise to 30 milligrams. This rise is probably due to the nephritis which generally accompanies terminal diabetes. The uric acid may also rise at this time, but usually rises earlier in response to a lessened kidney excretory function. The creatinin remains within normal limits. In the severe cases, especially those fed on a fatty diet, the lipemia rises as high as from 0.83 to 0.91 per cent (normal 0.59 per cent) or even up to as high as 1.4 per cent. The cholestrol is raised with the lipoids up to 0.82 per cent. In the terminal cases with acidosis the carbon dioxide combining power of the plasma is lowered and the blood phosphates are greatly increased. There is marked increase in the acetone bodies (oxybutyric acid, diacetic acid and acetone) in the blood. These bodies range as high as 250 milligrams per 100 c.c. of blood. Diabetics under good control average from 10 to 40 milligrams of acetone bodies per 100 c.c. of blood. The blood chlorides are normal.

#### *Acidosis*

This disorder is probably a defect in the carbohydrate metabolism whereby the end products of metabolism are not completely oxidized in the organism and form acid bodies. These bodies require bases for their neutralization and excretion, and so the normal alkali reserve is depleted. Acidosis is seen in many diseases and conditions. It is seen in diabetes, nephritis, following anesthesia, in a malignant form in gastrointestinal upsets of children, in uremia, pneumonia, malnutrition of various causes, and in starvation. Many laboratory tests have been evolved for the detection of acidosis and the estimation of the severity of the process. Among these are: (1) the amount of sodium carbonate needed to render the urine alkaline; (2) the estimation of the acetone bodies in the blood; (3) the estimation of the tension of the carbon dioxide of the alveolar air; (4) the estimation of the hydrogen ion concentration of the blood plasma; (5) the carbon dioxide combining power of the plasma; and (6) the estimation of the alkali reserve of the blood. Of these tests, the two that seem to be the most dependable are: (1) the estimation of the carbon dioxide combining power of the blood plasma, and (2) the estimation of the acetone bodies in the blood.

Normally the blood contains from none to 3 milligrams of the acetone bodies in 100 c.c. of blood. In acidosis, this rises to 25 milligrams and in the terminal stages up to as high as 150 milligrams per 100 c.c. of blood. In health, the carbon combining power of the plasma

ranges from 77 volumes per cent to 85 volumes per cent. In acidosis, this drops down to 40 and in severe cases to 30 volumes per cent. These procedures are good ones to use in following the case where Allen's starvation treatment of diabetes is being used. (See Section A.)

In acidosis, the phosphates are increased to from ten to twenty times the normal limits, and the calcium in the blood is reduced. The values of the other substances sought for in blood chemistry depend upon the disease which leads to the acidosis. In nephritis the blood picture is of nephritis, and in diabetes, as of diabetes. Normal blood pictures are usually found in acidosis resulting from other diseases.

#### *Gout*

There is the greatest diversity of opinion as to the blood picture in this disease. It has been known for a long time that the gouty tophi were a compound of uric acid, but the estimation of the uric acid in the blood has not been conclusive. Some workers have found a marked retention and others, a normal amount or even a diminution. In gout, there is practically always a nephritis, and often the blood picture shows this disorder. The urea nitrogen is from 12 milligrams up; the creatinin, about 2.2 milligrams; the uric acid averages 4.4 milligrams. Previous to an attack, there may be a retention of uric acid which may go up to 10 milligrams. Fine thinks that gout is probably a special form of nephritis, manifesting itself in a certain chain of symptoms, and bases his conclusions on the blood picture. To solve this problem we must have repeated tests on normal and gouty persons. The differentiation between gout and the chronic arthritides is made fairly easy by blood chemistry. If there is a uricacidemia of 3 milligrams or over, the lesions are probably gouty. If retention is not found, the trouble is probably arthritis.

#### *Eclampsia*

This disease is still a puzzle in spite of blood chemistry. If there is eclampsia only, the blood picture seems to be normal. If there is an attendant nephritis, the blood picture is as of nephritis. Van Slyke notes that the urea nitrogen is not retained in eclampsia. This may be due not to a rapid elimination of the urea nitrogen but to its non-production by the ureagenetic organs. A fruitful field of research here awaits the investigative mind. In eclampsia, the chlorides rise up to as high as 0.61 per cent while the amino-acid nitrogen is normal or slightly decreased.

#### *Cancer*

The findings in cancer consist of a retention of all waste products in about equal amounts. The urea nitrogen ranges from 24 up to 58



milligrams, the uric acid from 5.5 to 9.7 milligrams, and the creatinin from 2 to 3.3 milligrams. The chlorides are decreased. The cholestrol in the early stages seems to be from 0.15 to 0.20 per cent but later seems to fall to from 0.10 to 0.12 per cent.

#### *Cardio-Renal Disease*

Here is a place where blood chemistry has a marked diagnostic value. Given a patient with albumin and casts, high blood pressure, decompensated circulation with edema, the diagnosis can be made between uremia and cardiac decompensation with a great degree of certainty. If the blood shows a low urea nitrogen, low uric acid and a low creatinin with a high chloride content, the case is almost certainly one of a primary heart lesion with a kidney showing passive congestion. If the blood findings are reversed—that is, a high urea nitrogen, uric acid and creatinin—the kidney is the primary factor with the heart involved secondarily. Thus the blood examination makes the diagnosis and the prognosis. By it the clinician can tell uremia from decompensation. If the patient has a threatened apoplexy with signs and symptoms of uremia, the blood picture, as told by chemistry, will enable the clinician to diagnose the case properly.

In heart disease, the chlorides are usually retained. In arterio-capillary fibrosis, the blood has a high cholestrol content. The few cases of myocarditis studied have shown a urea nitrogen of 14 milligrams and a creatinin of 2 milligrams. Finally, in cases of hypertension, with negative urine examinations, the blood examination will determine the fact of and the amount of kidney involvement. In case of any doubt as to the diagnosis, apply blood chemistry.

#### *Surgery*

In surgery, blood chemistry has a small but rapidly growing field of usefulness. Starting with the urologist in his effort to estimate the function of the kidney, it has spread rapidly to all the branches of surgery. If it can change urology so that old men can go through a severe prostatectomy with small operative risk, it surely has a wide field in general surgery. Operative risk is judged largely by the kidney function, and the best way to find out what the kidney is *not* doing is by means of blood chemistry. Also, the onset of post-operative acidosis can be foretold and many a patient saved from death from this cause. The urologist now uses blood chemistry routinely to determine the operability of his cases or urinary obstruction. It determines his method of operation and gives him a means of estimating the progress of the case with a far better degree of accuracy than heretofore. The estimation of the urea nitrogen is invaluable in diagnosis and prognosis.

The phenolsulphonphthalein test is used less and less, since many cases with marked retention of urea nitrogen in the blood show but little diminution in the output of this dye. Uremia can be diagnosed before occurrence of marked symptoms, by blood chemistry.

In cases of prostatic obstruction the following rule has been formulated: If the urea nitrogen is less than 30 milligrams per 100 c.c. of blood, the patient can be operated upon with reasonable safety; if the urea nitrogen is between 30 and 50 milligrams, proceed with caution, that is, use eliminative treatment first and drain the bladder under local anesthesia till the urea nitrogen drops to 30 milligrams or under, then operate; if the urea nitrogen is over 50 milligrams per 100 c.c., treat the case thoroughly till the urea nitrogen drops to 50 milligrams, then drain the bladder till the urea nitrogen reaches 30 milligrams, then remove the obstruction. In cases of prostatic obstruction the urea nitrogen will range from 18 to 100 milligrams or over, the uric acid from 3 to 8 milligrams, the creatinin from 1.5 to .45 milligrams and the chlorides from 0.3 to 0.5 per cent.

Post-operative acidosis can be told by the lowering of the carbon dioxide combining power of the blood plasma, and treatment instituted before it becomes futile. (See Section A.)

#### *Cholelithiasis*

In cholelithiasis, the cholestrol in the blood may be increased or decreased. It ranges from 0.13 to 0.25 per cent. No value, as yet, can be placed upon this estimation in this condition. In marked jaundice, the cholestrol rises as high as 0.3 per cent.

#### *Miscellaneous Conditions*

Intestinal obstruction has shown the non-protein nitrogen to go up to 55 milligrams. Fatal cases, however, have occurred with low values. This condition must be studied further.

Gastric ulcer cases have given urea nitrogen 24 milligrams, creatinin 2 to 3 milligrams, while duodenal ulcer cases give a little higher figures.

Syphilis has given these figures; urea nitrogen 25 to 45 milligrams, uric acid from 1.5 to 2.3 milligrams, and creatinin from 2 to 3.5 milligrams. If a nephritis complicates the lues, then the urea nitrogen rises to from 60 to 70 milligrams, while the creatinin and uric acid remain about the same. The chloride content of the blood seems to be normal. Here is a field for research.

Lobar pneumonia shows a retention of urea nitrogen up to 40 milligrams, uric acid up to 9 milligrams and creatinin up to 2.9 milligrams. The chlorides, as shown by the urine examination, are retained, but they are not found in the blood. They may be stored in the con-

solidated areas. The blood chlorides are low. There is a severe acidosis in pneumonia, and the carbon dioxide combining power of the plasma reaches as low a level as 30 volumes per cent. The mechanism of this acidosis has not as yet been determined.

Leukemia gives a high uric acid value, as high as 10 milligrams; the creatinin is increased to 2.5 milligrams, but the urea nitrogen is normal.

Pernicious anemia shows a very low cholestrol value, from 55 to 120 milligrams, and a high chloride content, up to as high as 0.6 per cent or more.

Pellagra gives a cholestrol value as high as 750 milligrams.

Poisoning by bichloride of mercury has given the highest blood figures yet obtained. In several cases quoted the values were; urea nitrogen up to 250 milligrams; creatinin, 33 milligrams; uric acid, 16 milligrams; and cholestrol, 340 milligrams. If the case recovered, these values were only temporary.

Asiatic cholera shows a very marked acidosis by the carbon dioxide combining power test.

Pregnancy gives a low blood urea and a high cholestrol value.

Anesthesia by ether lowers the carbon dioxide combining power of the blood plasma from five to ten volumes per cent for the average length of anesthesia. This must be kept in mind in operating upon nephritics and diabetics where the margin of safety between safety and acidosis is small. Chloroform anesthesia lowers the carbon dioxide combining power of the plasma to a greater degree than ether, and gas-oxygen does not lower it as much.

*The endocrines.*—The blood chemistry of the endocrine disturbances has not been as well worked out as it will be. The dextrose tolerance in creatinism, Addison's disease and hypopituitarism is markedly lowered from the normal. In hyperthyroidism and in hyperpituitarism, the dextrose tolerance is very high and there is a marked hyperglycemia. After thyroidectomy, the dextrose tolerance is markedly lowered. The hypodermic injection of epinephrin in some of the hypo-endocrine disorders gives a temporary hyperglycemia, but does not effect the renal threshold for dextrose.

#### SUMMARY

An effort is made to show the clinical importance to be attached to the findings in blood chemistry.

The need for the further study of many unelucidated points is shown.

The need for close cooperation between ward and laboratory is evident.

## THE IMPORTANCE OF CORRECT DIAGNOSIS<sup>1</sup>

BY LIEUT. COMMANDER JOHN J. O'MALLEY

*Medical Corps, United States Navy*

EXPERIENCE with cases that have passed through the service and come up before the Veterans' Bureau for classification and estimation of disability present, gives the impression that very frequently a diagnosis of serious diseases is made on very slight or certainly insufficient evidence. Some cases actually appear as if the diagnosis were made to push the case along and get him off the doctor's hands to let someone else along the line try and adjust the clinical signs and symptoms to the diagnosis made. Often the final diagnostician is placed on the defensive with the array of physical signs and symptoms recorded and accepts the previous findings, the patient gets a high disability rating and lives forever afterwards as an expensive charge to the Government.

Diseases of the lungs, heart, neurasthenias and the various types of endocrine diseases are often incorrectly diagnosed by the medical officer who first sees the case, and succeeding medical officers who handle the same case are often forced to accept the diagnosis because they are unable to disprove it. It is a simple matter to record a diagnosis of incipient pulmonary tuberculosis, but it is absolutely impossible in many cases to disprove it, and when such a diagnosis is made and accepted the patient gets a high disability rating with expensive hospitalization, vocational training, and liberal compensation for the balance of his days. A great many mistakes have been made in diagnosing cases as tuberculosis, and today there are many men performing their usual pre-war vocation with the same vigor now as before they entered the service, receiving monthly compensation and accepted by the community as arrested cases of this disease. The same can be said of the diseases of the heart.

It is very satisfactory to the diagnostician to correlate signs and symptoms and establish an early diagnosis, and probably our record offices are too urgent in forcing a ward officer to a diagnosis in order to keep the office records up to date and rid the regular forms of cases under the classification of "diagnosis undetermined." But it is most unfortunate for the patient to be incorrectly diagnosed as chronic pulmonary tuberculosis or chronic heart disease as it means an entire change in his mode of living, and it is most expensive to the Government. A few râles found in any part of the lungs, with a loss in weight,

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<sup>1</sup>Read by title at the 30th annual meeting of the Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.

and a roentgenogram showing some infiltration in this area, make the case suspicious, but it requires much more evidence to properly diagnose it as tuberculosis as there are other diseases that will produce the same line of signs and symptoms.

Heart murmurs are often given more consideration than they deserve. Advancement in our knowledge of diseases of the heart has taught us that systolic murmurs, in the absence of definite evidences of myocarditis or disturbances of the function of the heart, should be lightly considered; a presystolic or a diastolic murmur is more important and deserves a very thorough examination with the use of polygraphic tracings to determine if there is any disturbance with the heart muscle. In the final analysis of any valvular lesion it is the degree of function that remains in the myocardium that really determines how much importance there is to be placed on the lesion of the valve. It is a frequent thing to find a patient with a systolic murmur diagnosed as endocarditis or myocarditis.

During the war the draft forced into the service many men who were on the border line between sick and well. A considerable number were of the type that habitually patronize the many clinics of our large cities and travel around from one hospital to another, never improving and having no intention of getting well. As soon as they reached a training station or a training camp they promptly patronized the sick bay and finished their war service. Today they are "wards" of the Government, receiving a liberal compensation, and while they are still attending the clinics it is not in the rôle of a habitu  , but more as a patron, since they have money and are not depending upon charity. The war and the draft were a blessing to this class.

The many and varied diagnoses that these patients have in their histories would seem to indicate that the medical officers who handled their cases during their first admissions considered very lightly the possible consequences to the Government of placing diagnoses of disabling diseases in their cases without having used complete modern methods to arrive at a diagnosis.

The compensation list of the Veterans' Bureau is already enormous and is increasing so rapidly that the figures and the sums paid out within ten years from now will be stupendous. A number of the men drawing compensation and the other favors of the bureau should not be receiving these benefits, and a very large number have received too high a classification for their disability.

This is directly attributed to faulty or hasty diagnosing in many cases, and the responsibility rests upon every medical officer of all the services to exhaust every method used in modern diagnosis to abso-

lutely assure himself that he is correct before placing a diagnosis of a disabling disease on any patient. It may take weeks or even months in some cases to properly classify these diseases, but no matter how long, it is time well spent and it will save thousands of dollars for the Government.



## PENETRATING ABDOMINAL WOUNDS—A SERIES OF FIVE CASES IN THE MILITARY SERVICE

By HAROLD W. JONES, M.D., F.A.C.S.

*Major, Medical Corps, United States Army*

THE FOLLOWING résumé of five cases of penetrating abdominal wounds by various weapons, all occurring in my hands in the military service during the last two years, is presented. The mortality in this short series was 60 per cent and that of the cases operated on 50 per cent, which at first sight seems rather appalling. Considering the extremely serious character of the damage inflicted in every instance, however, it seems a wonder to me, as I recall them, that the mortality was not 100 per cent. The encouraging thing about the cases seems to me to be that no wound which penetrates the abdomen need necessarily be regarded as hopeless and that promptness in getting into the belly is often well rewarded. In one patient the abdomen was opened, the severed mesenteric vessels secured and resection of the gut begun in the almost unbelievable time of twenty-five minutes, due to a fortunate and almost never present set of circumstances, while, in a second, operation was begun in about fifty minutes. Both of these patients recovered. The last reported was wounded one mile from the hospital and was dead on arrival, of hemorrhage from the mesenteric artery. An operation within fifteen minutes might have saved him from bleeding to death, but in such violent hemorrhage the case may well be regarded as hopeless from the start.

*Case I.*—Soldier, white, aged 21. General Hospital 41, U. S. Wound of the belly, entrance left of umbilicus, exit through the pelvis near great trochanter, right femur, wounding iliac vein in its course and causing multiple perforations of the ileum and mesentery. Weapon, service rifle at a distance of a few feet. Operation within twenty-five minutes of injury, under nitrous oxide. About 26 inches of ileum resected and lateral anastomosis made. Just before closure a further search revealed a complete severance of the ileum about 10 inches above the anastomosis. A second anastomosis (end to end) was made and the belly closed. Uninterrupted recovery and to duty in one month.

*Case II.*—Soldier, colored (R-410934), aged 21. Camp Stotsenburg, P. I. Wounds of the belly (two), the first just above McBurney's point, the second below the ribs on the left. Weapon, a heavy cavalry saber, used while victim was asleep, with intent to kill. Operation under ether within two hours revealed a belly full of blood, and the mesenteric vessels of ascending colon severed at the mesentery. Bleeding controlled and the second wound enlarged and stomach drawn out but no wound revealed. The man died four days later of gas bacillus peritonitis. Autopsy showed, in addition to the damage described,

two minute wounds of the stomach perforating the organ anteriorly and posteriorly, but entirely closed. A minute puncture of the vena cava was also discovered which accounted for a considerable amount of blood in the abdominal cavity.

*Case III.*—Soldier, colored (R-1008464), aged 26. Camp Stotsenburg, P. I. Wound of the belly, wound of entrance below the ribs to the left (nipple line) exit at a lower level, region of the kidney, which was not, however, perforated. Weapon, 45-caliber automatic pistol at a distance of 3 feet. Operation under ether about two hours after injury, the man in the meantime having been carried in an automobile a distance of 7 miles. Laparotomy, slightly to left of median line, showed serious hemorrhage from divided mesenteric vessels and a perforation at superior portion of the splenic flexure of colon with free fecal matter in the belly. Closure with a double line of sutures with abundant drainage. Death from gangrene of colon and peritonitis in three days, as shown by autopsy.

*Case IV.*—Soldier, Filipino (R-321672), aged 32, Camp Stotsenburg, P. I. Wound of belly, nipple line to left, below ribs, with prolapsed omentum. Weapon, a long knife or bolo. Operation fifty minutes after injury under ether disclosed the anterior wall of the stomach just above the greater curvature, slashed completely through to the posterior wall, which was also divided, the anterior wound being  $2\frac{1}{2}$  inches long and the posterior 1 inch. A large branch of the epiploica sinistra artery divided and the gastro-colic omentum as well. Wounds of stomach closed with a double row of sutures (catgut and silk), the vessels tied and the belly closed with drainage. A sinus persisted at the site of the original wound which was excised two months after injury. A month later a second sinus appeared at the point of drainage with a very apparent beginning small hernia. This was excised and found leading to the stomach wall to a silk suture; the suture was removed, the muscular wall of the belly repaired by overlapping and the wound closed. Complete final recovery and restoration to full duty occurred in this case.

*Case V.*—Soldier, Filipino (6613924), aged 24. Was shot in the abdomen at a distance of a few feet by a comrade, the weapon being a 45-caliber automatic pistol. Wound of entrance 2 inches to left of median line  $\frac{1}{2}$  inch below the level of umbilicus; wound of exit about center of left buttock. Death from hemorrhage in about twenty minutes, from division of the mesenteric artery. Multiple perforations (7) of the ileum. No wound of the large gut.

Just what the mortality of the operative and non-operative penetrating wounds of the belly (other than shell wounds) will show during the period of the war I do not know, of course, but it was of interest to me to look up some of the statistics of two decades ago during active warfare in the Philippines. Thus in one year the Surgeon General's report gives 35 such wounds with 28 deaths, and only four operations performed, not one being followed by recovery. In another year 14 out of 17 died, while in still a third year 8 out of 10 died. The average



total mortality for the three years was over 80 per cent and the mortality in the operative cases truly appalling. Practically all stab wounds of the belly died. Even now the sudden tragedy is apt to occur at a place remote from prompt and efficient treatment and often every minute counts. The old rules seem to be the best; if the belly is penetrated, early operation is demanded and, if you operate, keep to median line irrespective of the location of the wound except in rare instances. If this last precaution is neglected, one is apt to regret it. When the large intestine is wounded and there is any doubt as to the viability of the gut (and there will be doubt in most cases), it is probably by far the wisest plan to bring it to the operative incision and provide for a fecal fistula rather than to attempt either a closure or a resection. Where the stomach or small gut only is involved, we can take chances on infection, but where the colon is perforated we cannot, and if a drain is placed to the suture line, a fistula will result anyway. Therefore it might as well be provided for from the start.

Comparatively few medical officers in the Army have had an extensive series falling in the class of those described, since with most of us, for many reasons, with the Army scattered over the world, individual cases are few and far between and we have not the material that falls to the lot of the accident room of a large metropolitan hospital, while the majority of us during the war did little, if any, professional work. My principal reason for presenting so short a collection is that, if I wait to accumulate a long one, I shall probably be on the retired list before it can be published.



# DELOUSING AMERICAN TROOPS AT BORDEAUX, FRANCE, PRIOR TO THEIR EMBARKATION FOR THE UNITED STATES

BY MAJOR LAWRENCE H. DUNN, OVID, N. Y.

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NOTWITHSTANDING the considerable amount of work involved in delousing the American troops in France prior to their return to the United States, and the importance of this work, there has been but little published on the subject. This article, which was submitted in practically its present form as a report to the Medical Department, U. S. Army, in November, 1919, is therefore presented as a contribution on this work.

For some time before the signing of the armistice, and the return of our troops to the United States was being considered as an immediate event, the importance of delousing the entire American Expeditionary Forces before leaving Europe was already under contemplation and the plans for this activity being worked out.

While the delousing of single individuals, or small detachments of men, was a simple procedure, when applied to the millions of men comprising our army abroad it assumed unlimited proportions. More especially was the magnitude of this activity appreciable when carried on at the ports of embarkation and oftentimes while the ships were lying in the harbors and waiting for the troops to embark. Under such circumstances, when time proved to be an important and expensive factor, this work was necessarily carried on under high pressure and the difficulties attendant on its successful operation were greatly increased.

Of the several ports of embarkation in France where this work was carried on, the writer had the opportunity of being connected with it at Bordeaux and Brest. Of these two ports, or in fact at any of the ports where delousing work was done, the system adopted at Bordeaux was quite probably the most satisfactory one. However, by this it is not meant to speak disparagingly of, or condemn this work at the other ports, and it must be taken into consideration that a much smaller number of men embarked at Bordeaux than at Brest, also that the ships sailing from the former port were considerably smaller in size and capacity than those sailing from the latter. These circumstances permitted of a system at Bordeaux which possibly would have been impracticable at Brest with the increased number of men to be taken care of.

At Bordeaux practically all of the towns and villages within a radius of 15 miles and more were used as billeting places for our troops. When they arrived at this port with the intention of embarking as soon as the shipping facilities permitted, they were detrained as near their billeting areas as possible. They then marched or were transported in trucks to the towns selected for their billets.

All troops embarking at Bordeaux passed through the Bordeaux Embarkation Camp, causing a constant shifting of the organizations at this camp. As rapidly as organizations embarked and left vacancies at this camp others were brought in from the surrounding billeting area to be prepared for embarkation, keeping it filled to capacity at nearly all times.

This embarkation camp really consisted of two separate camps; one known as the Entrance Camp and the other as the Permanent Camp, or Camp Genicart, as it was sometimes termed. These were about three-quarters of a mile apart, but both were under the same administration, etc. Troops arriving from billeting areas were received at the Entrance Camp and detained there until embarkation movements left available quarters for their accommodation at Camp Genicart. When such quarters were available the troops next in turn to leave for the States were ordered to this camp for delousing and final preparation for embarkation. All troop movements between the two camps were arranged on a regular schedule, the men being dispatched by companies from the Entrance Camp at intervals of from twenty to thirty minutes apart. This allowed their steady arrival at Camp Genicart in such numbers as could be taken care of at the delousing plant, or "Mill," as it was more commonly termed. It was necessary to regulate their arrival at the "Mill" in this way to permit of its running at full capacity during the hours of operation and yet not have the men arrive in larger numbers than they could be taken care of and force them to wait for some time.

Upon their arrival at the "Mill" they first entered a large steel and corrugated iron structure, about 300 feet long and 66 feet wide, which had originally been intended for a hangar. About two-thirds of this building was used as a waiting room and afforded shelter for several thousand men. This was found to be imperative, especially during the inclement weather of the winter months. A wooden railing separated the shelter portion of this building from the remaining third of the space, which was used for the inspection of clothing and equipment. After entering the shelter room the men filed through openings in the railings to the inspection department. As they passed through these openings each man was given a new Red Cross bag—small muslin or calico bags

about 12 inches deep and 10 inches wide which were donated by the American Red Cross—in which to carry his small personal effects, and a clothing issue blank on which to check off any articles necessary for replacement or to fill out his complement. At the same time the strings of their identification tags were cut, as they filed past, by men stationed at the openings of the railings for that purpose. The old strings were dropped in galvanized iron cans to be burnt later and the tags placed in the owner's Red Cross bag. If the men placed them in their pockets, they stood a good chance of losing them while undressing or while hanging their clothes on the racks to be deloused.

After entering the inspection department each man was directed to a low, wooden table, on which to spread out all the clothing and equipment carried in his pack or barrack bag. This was all examined by an inspector, one of whom was in charge of each table. All ammunition, or empty shells with the caps unexploded which were being taken back to the States for souvenirs, were collected by the inspectors. All surplus clothing was taken from the men and sent to the salvage plant for renovation. Unserviceable clothing was condemned and checked off on the clothing issue slip held by each man. This checking by the inspectors allowed drawing of new clothing in exchange for articles worn out and condemned. At this place the men were also instructed with regard to putting their money, watches and all other valuables and small personal effects, not of cloth, in their Red Cross bags to prevent loss. All blankets were also taken up here to be replaced by sterilized ones later on.

After the inspection was completed the men left this room and passed through a small, open yard to the administration office about 20 feet distant. This room was 100 feet long and 19 feet wide, with an L-shaped wing at the end. Long tables extended down either side throughout its length to the end of the wing. As the men entered this room they formed in two files and passed slowly along in front of the tables, one file to each row of tables. As they moved along they were questioned by a row of clerks seated behind the tables, who filled out all service cards and other papers necessary for embarkation. These were completed by the time the end of the room was reached.

As the men reached the exit of the administration room they were counted into the disrobing room of the delousing section. This section consisted of a disrobing room, disinfecting chamber, bath room and dressing room. The disrobing room was 122 feet long and 32 feet wide. A broad, open aisle extended down the entire length of this room at the right-hand side upon entering. Fence-like railings extended from the left-hand wall for a length of 22 feet, dividing the remainder of

the space into ten sections or stalls, all opening on the side aisle. Seats were arranged on either side of these railings, providing seating accommodations on both sides of a section throughout its length. Numbers painted on the railings indicated the space for each man and prevented crowding.

The dressing room was of the same size and arrangement as the disrobing room. It extended parallel with the latter but was about 20 feet distant, the space between containing the disinfecting chamber.

An open space of about 2 feet intervened between the walls of this disinfecting chamber and the disrobing and dressing rooms on either side. This space was intended as a fire control in case of accident. This chamber was of the same length as the rooms on either side, 122 feet, and 14 feet wide. The walls of this chamber were double with about 6 inches of space between. The inner wall was constructed of boards lined with corrugated iron on the inner or even side, while the outer wall was of similar structure except that the corrugated iron was on the outer side, the 6-inch space between the walls being filled with sand. The ceiling, which was about  $6\frac{1}{2}$  feet high, was of the same construction. This made an excellent wall to prevent loss of heat from the chamber, was of cheap material and easily erected. The floor was of cement.

This chamber was divided by two partitions into three separate chambers, or ovens as they were called. The end ovens were each 37 feet in length and the central one 48 feet. Each oven was transversed by small narrow-gauge Decauville railway tracks, Ovens No. 1 and No. 3 each having three tracks and Oven No. 2, in the center, having four. These ten tracks crossed the ovens and extended at either side, through doorways at each track, into the disrobing and dressing rooms for the length of the sections.

A rack on which to hang the clothing to be disinfected was provided for each of these tracks. These were built of wood, excepting the wheels and axles, which were of iron and of the type regularly used on the Decauville tracks. These racks were approximately 6 feet in height, 13 feet in length and  $3\frac{1}{2}$  feet in width. They were of simple construction, consisting of two oblong wooden frames, the lower one being built on the running gear and acting as the framework for the floor of the car. The upper one was about  $4\frac{1}{2}$  feet above and held in place by upright standards extending from each end of the lower frame. Slanting braces from both the upper and lower frames helped to support and strengthen these standards. At the top a central crosspiece extended between these two uprights, longitudinally through the center of the upper frame. Short crosspieces passed over this central brace

and ended at the sides of the frame to which they were securely nailed. There were thirteen of these crosspieces, each one having hooks screwed into it at intervals of approximately 3 inches apart. Screw hooks were also inserted at about the same intervals along the outer frame pieces and on both sides of the central crosspiece. These hooks were provided for the purpose of hanging the clothing to be disinfected on them. Stout iron screening, of  $\frac{3}{4}$ -inch mesh, was stretched within the lower frame of the rack at the bottom above the wheels, thus forming a basket of the lower part of the rack. Numbers painted at intervals along the side pieces of the upper frame to correspond with the numbers on the seats in the section indicated the space allotted to each man and prevented confusion.

Upon entering the disrobing room the men were counted through the doorway in sufficient numbers to correspond with the capacity of the sections that were empty at the time. There were three sections to supply each end oven and four for the central one. From twelve to sixteen men were allowed to each rack, the number depending entirely on the amount of clothing and equipment carried by the men. Extra personal clothing or shortage of the full complement usually caused the variation between the minimum and maximum numbers. As each man entered this room he was in possession of all his belongings, and it was surprising to note the difference between various organizations as far as personal effects were concerned. Some of the organizations arrived with their full amount of clothing and considerable personal effects in addition, which usually necessitated reducing the number of men to the rack to twelve. Others coming in with but few, if any, personal effects and with a great deal of their clothing salvaged at the inspection room, could be handled at the rate of sixteen to the rack. Infantry organizations seemed to have the minimum amount of baggage and the engineers the maximum.

A man was stationed in each section to instruct the men in regard to hanging their clothing on the racks and to supervise the loading of the same. This instructor, usually a noncommissioned officer, had a second man to assist him and to pull the empty rack from the oven and push it back again when loaded. While the men were undressing they received their instructions with reference to loading their effects on the rack.

When the empty rack was pulled from the oven they began loading at once. Pack carriers, helmets, extra shoes and all metal, leather and web equipment were placed on the screen floor of the rack. All cloth articles were hung on the upper hooks; this hanging of the garments was an important operation, requiring constant vigilance on the

part of the section instructor and his assistant to see that they were disposed of in the proper manner. All clothing was hung as widely separated as space permitted and but one garment to a hook. All long articles required that the lower ends be looped up to prevent covering the articles on the bottom of the rack. Shelter halves especially required close watching in this respect. All this was carried on with as much speed as could be attained and yet have the racks loaded properly. From three to five minutes was the time usually required to load the racks. Shoes worn at the time were not placed on the rack but were retained and worn while in the "Mill."

Some of the instructions given to the men were as follows:

Keep quiet and work fast.

Remove all valuables from your pockets and place them in your Red Cross bag.

Remove all matches from your pockets before hanging your clothes on the rack.

All cloth articles must be hung on the rack. Do not attempt to carry any cloth articles in your Red Cross bag except new silks and your tobacco bags.

All those wearing money belts will remove the money and place it in the Red Cross bags and hang the belt on the rack.

All scapulars must be removed from around the neck and placed on the rack.

Do not carry handkerchiefs or cloth housewives in your Red Cross bag.

You will be furnished with a clean towel in the bath room, so do not carry one in your bag.

Place all articles of clothing that you are going to salvage in a separate pile. Do not hang them on the rack as they are to be thrown through the salvage windows as you leave the section.

You will receive clean underwear and socks, so do not hang those you are removing on the rack. Place them with your condemned clothing to be salvaged.

Have all your web, leather and ordnance equipment separate from the rest of your clothing to load on the bottom of the rack as soon as it comes out. Load this on first.

Hang all clothing on the hooks at the top of the rack.

Hang but one garment on a hook and as widely separated as possible. Do not crowd the clothes on the rack.

If you get your stuff hung up first, help the man beside you.

Remember the letter of your section and your seat number.

As soon as the rack is loaded pass out of the section into the aisle. Throw all your salvage through the salvage windows as you go past them.

Watch the man ahead of you and do as he does.

It was always necessary to repeat these instructions and explain them in detail several times before they were understood by some of

the men. They were usually instructed as soon as they had entered the section and were undressing and again after they had removed their clothing and were waiting for the racks to come out of the ovens. Signs informing the men of what to do were painted on the walls to aid in facilitating the work as much as possible. The section instructor also marked the letter of the section and the seat number on the back of each man's clothing slip to prevent mistakes.

As soon as the racks were loaded the men filed out of the sections into the side aisle, those from each section falling in behind the ones ahead of them. Two inspectors stationed in the aisle examined the contents of each Red Cross bag as the men passed along. This was a very necessary procedure to prevent the carrying of cloth articles—liable to cause reinfestation—which the men persisted in doing in spite of all instructions received. All such articles found in the bags were returned to the owners to be either taken back and turned over to the instructor of the section to be hung on the rack, or to be salvaged. This was left entirely to the wishes of the owner who usually disposed of the articles as their value prompted. The men then filed passed medical inspectors stationed in an alcove at the end of the aisle, who examined them for venereal diseases. Upon the completion of this examination they were given clean towels at the bath room and passed in for a bath.

The bath room was 27 by 32 feet in size, with a cement floor and equipped with about eighty shower heads. Shelves extending between each row of showers provided a place on which the Red Cross bags and shoes could be deposited while bathing. Wooden duck boards, about 4 inches high, were arranged under the showers for the men to stand on, instead of on the cement floor which was liable to be cold in winter weather. A semi-liquid soap was provided for bathing, being placed in containers at various parts of the room so that each man could take up in his hand as much as necessary to thoroughly soap himself. The hot water for the baths was supplied from a 5,000-gallon tank, set at an elevation of about 12 feet, out in the yard near the boiler house. This was heated by coils of hot steam pipes and the injection of live steam from the boiler. Mixing valves in the bath room, operated by an experienced man, regulated the temperature of the water for the showers. The men were given as much time for bathing as the conditions allowed, all of them getting time enough for a thorough soaping and a good bath.

After finishing their baths the men moved from under the showers to the ends of the duck boards, where, after drying themselves, they again fell in line and passed into the medical examination room.



In this room the medical inspectors were stationed in a row and as the men filed past each man had a certain part to examine. Those inspecting for skin diseases also looked for vermin. One inspector was seated on a high stool, and as the men reached him they raised their arms to allow for an examination for *Pediculi* or nits on the body hairs of the axillae, back, chest or other hairy parts of the upper portions of the body and also the hairs of the head. At the next inspector the pubic region, buttocks, scrotum and legs were examined. The man to be examined stepped before the inspector, who was seated on a low stool and holding an electric light with a reflector in his hand. The edges of the hairy region of the pubes were first examined and then down to the penis, a small, flat piece of wood being used to separate the hairs. The man then raised his scrotum and turned it to expose the under side and the space between his legs for examination. The thighs, legs and between the buttocks in the region of the anus were next examined, and if no indication of lice or nits were present the man then passed on to the next inspector for a throat or chest examination, whatever was next in line.

The active stages of *P. corporis* were seldom found at these examinations, as those remaining on the body after the clothing was removed were usually washed off while in the bath room, except in occasional cases where they were found in the axillae or beneath the scrotum, owing to carelessness of the man in taking his bath. When *P. pubis*, or nits of either species, were found, the man was turned over to an orderly, with a card stating what had been found on him, and was conducted to a consultant at the opposite side of the room. After the presence of *Pediculi* was confirmed by the consultant, and his name and organization recorded by the clerk, the man was directed to the shaving room to be shaved on the infected areas. Safety razors were used for this work, and each man shaved himself as far as possible. On parts of the body where the men could not easily shave themselves they ordinarily shaved each other, which they seldom objected to doing, as usually each one needed the assistance of the other fellow as bad as the other fellow needed his. The shaving was done either dry or with lather, as preferred, the dry shaving usually proving to be the most satisfactory. They were allowed to please themselves in this matter as so many were under the impression that shaving without lather would be rather painful. This, however, was an erroneous idea and quite to the contrary, as where the hair was long the dry shaving was not as painful as with the use of lather, especially when safety razors were used.

A number of men who were on duty in the shaving room to inspect the work, and assist in shaving whenever necessary, watched closely

that all hairs were removed from the infected parts and none left with eggs attached to cause reinfestation a few days later. When the hair was removed the men anointed themselves with a lotion consisting of equal parts of kerosene and cottonseed oil. The cottonseed oil prevented dermatitis, which might have resulted if the kerosene alone had been used on delicate skins, liable to be more than susceptible after the shaving. After this lotion had been on for ten minutes the men were again examined by the consultant and, if found free from lice or nits, were sent to the bath room to receive a second bath to wash off the oil. They then passed by a table at the exit of the medical examination room where each man gave his name, number and organization. An officer from each company going through the "Mill" at the time was seated at this table to check the men from the company roster as they passed. This checking was always done under the supervision of a representative of the Medical Department of the "Mill."

Upon leaving the examination room the men next entered the clothing issue room. This room was 75 feet long and 52 feet wide, with a partition extending through the center to within 7 feet of the far end, which really made two long, parallel rooms with an open hallway connecting them at the end. Upon entering this room each man was given a clean suit of underwear and socks, which he at once donned. He was also given a blanket in which to wrap himself in order to keep warm while passing through the issue room, where it was impractical to stop to dress other than the underwear, socks and blankets. After these had been put on the men formed in two lines, each line moving along in front of a long counter. In passing along they presented their clothing slips, to the men working behind the counters, at each section where an article checked on their slips for exchange was issued. For instance, a man entered who was short of breeches, blouse, shoes and cap. He received his clean underwear, socks and one blanket at the door as they all did. He then passed along until the breeches section was reached, where he received his new breeches and the issue of same checked on his slip. Continuing in line, he reached the blouse section, where the same thing occurred, and so on until he had drawn his full complement of clothing. As he left the issue room each man received two more blankets and new tape for his identification tags.

Guides stationed in the aisles of the dressing room looked at the slip of each man as he entered this room and directed him to the place corresponding to the section letter and seat number marked on the back. This prevented them from becoming confused and resulted in each man reaching his proper place and getting his own clothes from the rack. If the racks were still in the ovens when the men reached the

dressing room—as they usually were—they put on such garments as they had drawn on the way through the issue room, arranged the new tape in their tags and replaced them about their necks, folded their blankets more conveniently for their barrack bags and sat down to receive instructions from the man in charge of the section and wait until the racks came out. One noncommissioned officer, as instructor, with an assistant to handle the rack, was stationed in each section in the dressing room as in the disrobing room. He instructed the men regarding the necessity of rapidly removing all clothing from the rack as soon as it came from the oven and placing it on the seat at their own number before starting to dress. It was his duty to see that the racks were speedily unloaded and to maintain order and quiet in the section. The racks were ordinarily unloaded in from one-half to one minute and were then pushed back in the oven to be pulled out in the disrobing room and loaded again. After taking their clothes from the racks, the men dressed rapidly, packed their barrack bags and were ready to leave the dressing room.

Before leaving the section all were questioned as to whether or not they had their full equipment. If any were short, they were sent back to the issue room to secure what was needed to make up the shortage. Those having full equipment left the section and passed up the aisle to the exit, where they were met by an inspector who examined all new shoes to see that they fitted properly. When they did not, the wearer was sent back to make an exchange for a pair that did.

Upon leaving the dressing room the men next passed into the barber shop, where an inspector examined the hair of each man and those in need of a hair cut were sent to the barbers, of whom there were about sixteen in the shop. Those whose hair required no attention marched through the barber shop to the door, where, after giving up their clothing slips which they had thus far retained, they passed outside. These slips were all collected and used in determining the total issues drawn by each company or regiment.

From the barber shop the men passed along a boardwalk for a few yards and entered a large, open building where they were given a more leisurely opportunity to readjust their leggings, make up their packs if no barrack bags were carried, or finish any dressing that they needed to do. After this was completed they formed in companies and marched to barracks in the Permanent Camp. The barracks in this camp were for *clean troops only* and were never occupied by any men unless they had first passed through the "Mill." In this way the barracks at the Permanent Camp were kept free from infestation with lice.

After being disinfected all men were confined to camp until time to

march down and go aboard ship. This was an important point and strictly essential in keeping the men free from danger of reinfestation, as it would have left a large possible leak in the delousing system had they been allowed to leave the camp and visit Bordeaux. If they were cleaned up 100 per cent and then allowed to visit Bordeaux afterwards, a certain percentage of them would have been liable to have had relations with women of loose character and been exposed to the danger of again becoming infected with vermin, if not that of contracting venereal diseases. All chances of reinfestation were safeguarded as closely as possible. No men were ever sent back to the Entrance Camp to be billeted, and any who were detailed on work liable to bring them in contact with possible verminous individuals or articles were sent through the "Mill" again before being allowed to return to their barracks. This was in order to eliminate the chance of reinfesting themselves or their barracks.

All the clothing of the men passing through the "Mill" was disinfected in the ovens by being subjected to dry heat at a temperature of from 167° to 212° F., for a period of thirty minutes. As the success of the whole work depended mainly on the efficiency of the ovens, they were watched very closely, as steady a temperature as possible maintained, and no clothing allowed to leave them in less than thirty minutes.

When this "Mill" was first started the ovens were heated by gasoline-burning heaters placed in pits in the floor of each oven. An elevated tank of gasoline, located in front of the building and at some little distance as a protection against fire, served as a supply for the burners. The gasoline was received in drums and forced into this tank by means of hand pumps. Compressed air was later used both to force the gasoline from the drums to the supply tank and from the tank to the burners.

However, it was soon found that heating with gasoline was not at all satisfactory. It required that the very best grade, usually aviation gas, be used in order to obtain good results and the high degree of heat required for effective temperatures in all parts of the ovens. The too frequent burning out of the jets and the difficulties in securing new ones also helped to make the use of gas a more than unstable medium. The constant danger of fire was also a grave element to be contended with while using the gasoline burners. The steady dry heat and high temperatures caused any woodwork used in the construction of the ovens, such as the doors, inner walls, etc., to be at a point that was very easy to ignite. Although the tops of the pits were protected with sheet iron and iron screens this did not prevent articles from burning when they fell on these screens and were exposed to the hot blast of the burners

beneath. Any articles of clothing left hanging low enough on the racks to drag on the floor at the side when pushed into the ovens were also in danger of burning. Small articles such as handkerchiefs, socks, towels, etc., liable to drop from the racks while being pushed in would soon be smouldering if they fell near the edge of the burner pits.

It was always necessary to keep a man on guard at each oven door to discover the first indications of anything inside being on fire. This resulted in never having fires of any importance. Occasionally some piece of cloth or some of the woodwork would start smouldering but was quickly put out by the water and chemical extinguishers which were always near at hand. The small amount of oxygen in the ovens prevented any fire from gaining much headway while the doors were closed. This combined with the fact that the officers and men on duty at the "Mill" were all well drilled in fire control probably had considerable to do with the prevention of more serious accidents.

The use of gasoline to heat the ovens caused a considerable risk from accidents that would necessitate shutting down the "Mill" at some exceedingly busy time, when it would have delayed the embarkation of troops from this port to a serious extent. Therefore, after a few weeks' trial with gasoline, it was decided to heat the ovens with steam.

A large steam boiler already installed was being used solely for the purpose of heating water for the bath room, although it was of sufficient capacity to supply steam enough to heat all the ovens. Therefore, steam pipes were arranged in coils in each oven for steam heating. In Oven No. 1 about 2,400 feet of 1-inch pipe and 200 feet of 2-inch pipe, arranged in four coils, extended across the oven in the spaces between the racks when the latter were in place, at about a foot from the floor, thus giving a coil on either side of each rack. In Ovens No. 2 and No. 3 the coils were arranged in the same manner and 3,200 feet of 1-inch pipe used in each oven. These coils were all connected with a return pipe leading back to the boiler, this being necessary to prevent condensation of the steam in the coils farthest from the boiler which would have resulted in lowering the temperatures in the ovens. By the use of this return pipe with an automatic trap to regulate the steam return, a good circulation was maintained which provided a constant, high temperature.

The steam was a great improvement over the use of gasoline as a heating agent, the fire hazard being greatly reduced and a higher degree of heat maintained. The temperature of the ovens was from 194° to 212° F., at about a foot from the ceiling and from 167° to 185° F., at a foot from the floor. This was a temperature higher than necessary to kill lice or nits, but one factor is always apparent when dry heat is used in delousing work, which is that dry hot air is very slow in penetration

when compared with moist heat, especially if the garments are perfectly dry. For this reason a considerably higher temperature than necessary for the destruction of lice was maintained at all times to allow for the penetration of articles hung on the inside of the racks. They were kept in the ovens a full half-hour for the same reason. A shorter period of time and a lower temperature would have been quite effective if the clothes were always hung widely apart and not touching each other, but with each man hanging his own garments on the rack there were possibly times when they were hung closely together and crowded, even under the supervision of the section instructors. Therefore, the higher temperatures and longer exposures were practiced as a safeguard.

As before stated, the capacity of the "Mill" depended entirely on the ovens, and they in turn were governed by the amount of clothing in possession of the men going through, the ordinary capacity, however, ranging from 240 to 300 men per hour.

It was early decided that it was preferable to operate at a capacity that would allow of the best work being done than to handle greater numbers of men with the work not so thorough. At the capacity maintained a considerable number of men were taken care of daily with a large degree of certainty that the work was being well done. This number was increased by using a night shift when the occasion required, which was preferable to overcrowding the racks with a good chance of some of the men being still verminous when they left the "Mill," with the possibility of their infesting others while on board ship before reaching the States.

All the underwear discarded by the men was taken to a salvage building at the rear of the delousing plant. This building was 170 feet long and 40 feet wide, with four "Thresh" disinfestors installed across the building about midway of its length. The space between these was boarded up so that a tight partition was provided, separating the building into two rooms, a clean room and an infested room, and as the disinfestors had a door at either end they opened into both rooms. All the soiled underwear was taken to the infested room, where it was placed in the disinfestors and exposed to live steam at 5 pounds pressure, giving 218° F., of heat, for a period of thirty minutes, then removed from the disinfestors through the doors on the clean side. It was then washed in laundries located nearby. These laundries were of the portable French type, did excellent work, and gave good satisfaction. After being laundered the underwear was examined, resized, and sent back to the clothing issue room to be reissued.

Part of the blankets taken from the men at the inspection room

were disinfested in the "Thresh" machines, which, however, did not have the capacity to handle all of them in addition to the underwear. The remainder of the blankets were baked in the ovens at night when no troops were passing through the "Mill." Like the garments of the men, the blankets were brought into the disrobing room and hung loosely on the racks. They were baked in the ovens for thirty minutes and then unloaded in the dressing room by a second or clean detail of men. They were then folded and taken to the clothing room for reissue.

Taken altogether, the "Mill" at Bordeaux proved very successful and demonstrated the efficiency of dry, hot air for use in delousing large numbers of men. One improvement over the use of live steam is that it did not cause creases or shrinkage in the clothing. The leather and web goods placed on the floor of the racks were exposed to temperatures more than sufficient to be lethal for vermin but always came through without any of the injury that would have been caused by exposure to live steam for but a few minutes.

In addition to the delousing work done at the "Mill," a number of portable delousing outfits were in constant use in the billeting areas near Bordeaux. As many of the troops were stationed at the surrounding small towns for several weeks awaiting embarkation and before coming to the Embarkation Camp, a rather important problem was presented in keeping them clean and free from vermin, especially during the winter months. To this end a portable delouser and two portable bathing outfits were in constant use throughout the billeting areas, traveling from town to town. In addition to these and in order to provide more or less permanent delousing facilities in each area, which was really what was desired, a number of portable sterilizers of the American "Erie" type were secured and sent to the headquarters of each area. A crew of three men, a noncommissioned officer in charge, were thoroughly instructed in the operation of these machines at the Embarkation Camp and accompanied each one sent out. These men were responsible for the operation of the machines, subject to the orders of the medical officer in charge of the area. These sterilizers did good work in helping to keep the men deloused, which encouraged them in reporting any infestation as soon as they became aware of it themselves, as they knew that they would have an opportunity to be deloused in a thorough manner. That these sterilizers also helped to reduce the number of infested men arriving at the "Mill" for delousing previous to embarkation was quite evident. If more machines of this kind had been used earlier and under the direction of men who were familiar with their operation, it is quite probable that they would have decreased the number of cases of pediculosis in a marked degree.

# EDUCATION THE FIRST STEP IN PUBLIC HEALTH ADMINISTRATION AMONG PEOPLES PRACTICALLY ABORIGINALS<sup>1</sup>

BY LIEUT. COMMANDER W. E. EATON

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NO SUPPOSITION is entertained that anything new is being herein presented, but the writer's experiences of more than three years in endeavoring to administer public health measures among a foreign people have given him cause for thought along the following lines which, it would seem, deserve careful consideration by those whose duty or responsibility it is to engage in this work among our foreign neighbors. Nor are my remarks in the nature of criticisms of any existing activities.

Much has been written and said about conditions in countries like the West Indies—for instance, the character of the people, how futile efforts are to modernize them, etc.—yet it is believed a proper understanding of essential factors has not been brought to bear upon the case. Often we go in, seek out existing laws or make new ones and proceed to enforce them without success, and nothing is gained except what we may do with our own hands.

It would appear to be assumed at the beginning that one is to deal with people supposedly enjoying some education, or habits and customs approaching modern practices, and that these people comprehend more or less the law and regulations or other provisions, the intent of the law, the object to be attained through the endeavors of those officials whose duty it is to apply the statute principles set forth. A people of this order are certain to have a background, historical, educational, or otherwise, or in other words an experience, upon which this comprehension rests and from which it is devised. Such people have a fairly definite idea regarding hygiene and sanitation, more or less the same throughout the population, showing that they give thought to these matters although their conclusions may be erroneous. There is some unwritten traditional knowledge preserved and passed on by word of mouth to succeeding generations, and for this reason a generation of time is necessary for new principles derived from proper sources to permeate the thoughts and statements of the whole mass of people.

Among primitive peoples there are no such features of the case, there is none of the same background, there are no real thoughts on such matters beyond the simple demands for existence. Local, long-established habit and custom derived from provisions or lack of pro-

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S. Washington, D. C., October 12-14, 1922.



visions of nature, imitation of animals, lack of instinct, ignorance, superstition, lack of facilities, ways and means, all contribute to or influence the situation, the mentality, attitude and interest. There is no real knowledge of the cause of disease or condition, the why or wherefore; that to change the mode of living, the habit, the custom in the things that concern life and health is a means to improvement, to better things for the general good seems never to enter the thoughts. The outbreak of disease is believed to be the expression of an evil spirit.

The mistake therefore of taking the people at a face value which is far above their true status should not obtain, but a true valuation of their knowledge and comprehension must be made at the outset and future administration directed accordingly.

To further elaborate my thesis, let us consider the following:

Government is dependent upon the will of the common people. Consent and universal agreement create the law and regulation, and acquiescence to it. Under such circumstances government is easy, practically automatically operative, based on knowledge.

There can be no effective enforcement of law or regulation which has not the support of the common people as a whole. Law based otherwise can only be invoked by force. This force immediately creates opposition and disregard for the law and its enforcement. It is against the will of the people. Under such circumstances, government is difficult or impossible except by armed military dictatorship creating discord and revolution. Peace and tranquillity make for contentment and prosperity; prosperity supports a stable government. Health is the essential factor in productiveness, prosperity and happiness, and, therefore, in the advancement of civilization.

The administration of government should be centralized in an agency of the people working in harmony with public opinion, bringing about the application of the law based on knowledge understood by the majority for the good of the majority. This agency, supported by public opinion, should be empowered to punish the minority who dissents from the community will, desire and intent. Everything depends upon the spirit of the people.

It is futile to endeavor to force a law upon an ignorant people who are in the majority and who do not understand nor perhaps see the occasion for the need for such laws. The successful application of such laws is dependent almost solely upon the education of the people with regard for the need, and training of the people in the proper application, of such rules. Adequate or reasonable proof must be given that the application of such rules will produce the results indicated by the need of the rules.

Therefore, education is an outstanding element creating the will and desire of the people whereby governments are set up and established permanently.

Education is the crying need of the aboriginal or the semi-aboriginal peoples with whom we have to deal. It is not the small percentage of the population which has education and certain enlightenment, through its education or contact with outside peoples, that must be reached. It is rather the great mass of the lower class people who have no education, no example, no elevation, but live in an aboriginal state with primitive practices and who fall short of being true aboriginals, though their superstitions and primitive religious beliefs are in a measure more or less credited.

Among such a people it is exceedingly difficult to apply laws and regulations based on modern thought and knowledge as applying to disease, sanitation and proper living, to matters bearing upon the public health generally and to those elements which make possible the maintenance of the public health.

For generations going back continuously and contiguously to the jungle, the lowest classes have provided for the calls and service of nature, the birth of children, the disposal of the dead and the disposition of property in accordance with customs long established and not easily broken down. These customs have become the rule and the law, consented to and followed by all for no particular reason. The people are ignorant of modern thought and knowledge. One may have knowledge without education, education dispels ignorance, increases knowledge, and reveals the proper application of the knowledge at hand. This is what the aboriginal lacks and needs.

To change these customs and practices, it is necessary to show the need for change, to establish in the mind and opinion of the people the benefit to be derived, should the benefit be desired. Here again the desire must be fixed upon the mind of the individuals in sufficient number to create a majority which will demand the improvement.

A sick native enters the modern, though simple, hospital. He is put to bed on a soft, comfortable mattress. Soon he leaves the bed to sleep on the cement floor under the bed. It is his habit to sleep on the floor or the ground with a rock as a pillow when well; therefore, why not so when sick? No desire for comfort has been induced in his mind. His experiences have brought to him no knowledge of a bed, but he has knowledge of the ground. To tell or teach him the preference of the bed, to raise him from the dirt which infects his wounds or gives him disease, is to educate him, to increase his knowledge. Modern medicine is unknown to him, but witchcraft, spirits, superstitions, faith cures at

shrines and springs, and vile potions are those which hold his confidence. He is suspicious of modern effective aids; he does not suspect his own measures, no matter how ineffective. Those who suffer from vile diseases or conditions which offend the public are driven out of the community into the country, to be alone, to die, to supposedly exterminate the vile spirit. The fact that these practices spread the infection to other non-infected localities is a circumstance not understood nor believed to be possible by the mass of the people involved.

Conditions and diseases become chronic, of long-standing persistent type, resulting in new infection of the uninfected and more or less constant reinfection of those previously affected, constituting a vicious circle.

As a rule the aboriginal is opposed to measures of sanitation because they seem to impose upon him additional effort from which he derives no gain. He sees no occasion to conform to anything other than nature's simplest needs and provisions. There is a lack of comprehension of the intent of the law.

The medical man, the native physician, is usually the product of a local or national medical school, an institution contributing solely to the pride of the local profession who are its teachers and exponents. One hears much of the so-called disciples of such and such a doctor whose ignorant precepts are swallowed with awe. These disciples contribute to his self-esteem and self-engendered fame and reputation. Opposing the introduction of outside talent and having nothing with which to compare himself, the doctor locally produced considers himself highly competent but is in reality a most dangerous person and well bears out the old jibe that should one employ a physician death is assured, no matter what the ailment. When opportunity offers for contact, comparison or consultation with foreign medical talent, the native physician avoids this contact in order not to expose his lack of knowledge or ability, thus jeopardizing his position and business. Furthermore, it is practically impossible to get one out into the country, his dignity cannot be so affronted, nor can his wonderfully incompatible gunshot prescriptions be compounded.

When we come to the food supply, everything is eaten no matter what its state of preservation or decomposition. Animals are slaughtered under primitive conditions and the blood frequently drunk as it flows from the carcass. The meat of cattle is often kept for days, and fish are exposed to the deteriorating influences of heat, flies, etc., until these substances are unfit for human food, yet such articles are finally consumed as food camouflaged with garlic, onions, etc., often objectionable in themselves. Hence, one wonders why there is not more disease

and death from poisoning by ptomains; yet if sickness does result, no idea occurs to the aboriginal that his food might be to blame.

The source or potability of water means nothing. The fact that it is perhaps clear and running is a sufficient guarantee. If I should tell you that I myself have seen a man stop at the small flow of water in the concrete gutter at the side of the street in a large city and proceed to wash his feet, you would not be alarmed. Should I say that he then proceeded to bathe his perspiring face also you would be astounded. But if I go further and say that as a final act this same man scooped up with his more or less unclean hand some of this same water and drank it, you are aghast. Furthermore, when I say that the source of this water was a back yard wherein clothing was being washed and at the same time the stable was being flushed out, the water flowing into this gutter, someone would say that I was fabricating stories. Nevertheless I myself and others have observed these proceedings many times. It is an example of the wretched ignorance of the people of whom I speak.

It is frequently said and claimed that the sun and rain render the tropical lands clean and are the great purifiers. This is not so. Surfaces are more or less washed, but the filth of one locality is but carried to and deposited upon another already sustaining its full share. Modern laboratory and bacteriological examinations discover bacterial growths of such rapidity and magnitude as to demonstrate high concentration of contamination even when a small quantity is highly diluted. The soil and its vegetation are all polluted, and the water contains all manner of growths—algae, parasitic eggs, parasites themselves, larvae of flies, of mosquitoes, eggs of frogs, tadpoles, feces and urine of men and animals. Even the percolation of water through the ground does not remove these pollutions, due probably to the presence of seams in the rocks, coral structures or to crevasses worn out in the clay.

Diffusion of information regarding sanitation and health is considered to be one of the most important factors contributing to the success of public health measures. However, this would be a part of a general educational program. The illiteracy of the lower class people, which is the group most essential to reach, prevents dissemination of information through the usual channels to be found in modern communities, by printed matter, and requires the use of conversational contacts with the masses, statements in simple language which may be repeated by word of mouth from one to another on the train or in the market place.

We do not, however, always find education and instruction acceptable to the lower classes. There are two classes of the people to be

considered. The upper class, more or less well-to-do or in power, desires to keep the lower class in ignorance, for by so doing he may not only enhance and maintain his own position, control and importance, but also have at hand constantly a more or less wretched, poverty-stricken group of persons who must work for him in almost if not actual slavery and dependency, frequently receiving as compensation a bit of food and a rag of clothing. Often the lower class man is content with his lot, has no schooling and considering his situation as satisfactory if not ideal, desires that his children live and learn as he has and to have no more than he has.

Education and instruction are dependent upon the presence of properly informed individuals who may come in contact with the people. The real need, then, is usually an adequate number of trained personnel and effectives. Education of this personnel and other agents should precede attempts at education of the masses, the former by personal instruction and books and the latter by conversations, pictures, posters, etc. The object in view must be positively shown.

The foregoing might appear also to depend upon the employment of government paid native doctors or others who have served under a course of instruction and doctrinization.

Subsequently a continuous and vigorous enforcement of laws and regulation, particularly among the younger elements, the succeeding generations, becomes practicable.

Reduction of death rates seems impossible or particularly difficult, and the care of infants, especially the new born, must be upheld as a necessary requirement of the state rather than a burden imposed by nature to be lightly assumed and the offspring turn off to shift for itself so soon as possible, as is done by the lower animals from whom certain knowledge is derived or habits imitated by the aboriginal. Human milk must be shown to be the only proper food for the young child rather than bananas or mixtures of milk in advanced stages of decomposition, such as are to be found in use or for sale, and derived from cows, mares, goats, and women. The possibility of providing better facilities for accouchement should not be overlooked.

Finances are a thing to be conjured with. Large sums of money are necessary for any public health endeavor wherever it may be. This is much more the case among primitive peoples, where everything accomplished must be attained at government expense, with very little if any assistance from the individuals.

My contention, then, would be this:

We must not forget that education and a group of educated and impressionable people were the forerunner of modern sanitation and

sanitary measures, highly scientific attributes, in present-day communities—our present civilization. Should we, therefore, not apply the same force—and can we successfully achieve our aim without this force—among a people who are ignorant, uneducated, unknowing, not realizing their backwardness, living as they do in a phase of civilization many years behind our own? To be sure there are today many more or less cultured peoples whose lack of sanitation is remarkable, but this is their own fault, for they could improve if they would. I am speaking primarily of those who have not the knowledge or the ability to improve their status without outside help and direction.

It is believed that primitive peoples, who learn like children—which they really are—by imitation, by observation, by direction, will improve their living conditions if taught to realize by educational measures what is necessary for such improvement and what will be gained thereby. The force of law is vacant; the power of education and public opinion of the masses is far reaching.

Let us therefore abandon our expectation to accomplish our aim by vigorously enforcing the law but rather endeavor to develop educational means, teaching what the law should be, why it is necessary and what it will bring about. We should then attempt to sustain the law by intelligent administration, not by native judges whose interpretation of the law is absurd, capricious and erroneous, not to say malicious and fraudulent. Lacking enlightenment, native judges fail to comprehend the principles of the law. Law must be interpreted in accordance with its spirit so as to effectuate the purpose intended to be accomplished. The law should be sustained by judges who are of such educational attainments, broad mindedness and prudence that the spirit of education may be fostered and the court proceedings by their judgments will be those to instruct and impress rather than to punish and offend.

We must not expect those to be scientific who know not science, nor those to be judges who know not the law, nor those to be cultured who know not culture, nor the untrained and unrestricted to know discipline, for sanitation is discipline.



## THE BRIGADE SURGEON WITH A TROPICAL EXPEDITIONARY FORCE<sup>1</sup>

BY COMMANDER JOHN J. SNYDER

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WHILE ON duty in Santo Domingo as brigade surgeon of the Second Brigade of Marines, and being interested in the history of the island, which holds one enthralled, my mind indulged in flights of fancy as to what my medical forbears had seen and done!

We know Columbus had a physician with him on his first voyage, a man gifted with observation, who left a record of his experiences behind. He undoubtedly carried doctors with him on his succeeding voyages, which were organized on a much more ambitious scale.

Outside of La Vega and overlooking the Vega Real or Royal Meadow is a hill named the "Santo Cerro" or "Sacred Hill." Here the old chroniclers say Columbus with a force of 200 Spaniards, 20 horses and 20 bloodhounds defeated 100,000 Indians, being aided by a miraculous appearance of the Virgin. A church commemorates the victory.

As you stand on the hill by the church and look over the valley, you also see visions and dream dreams! You see a vision of loveliness and fertility unsurpassed. You dream of the battle on the steep slopes of the hill and the plain below and wonder where the battle started and how the handful of Spaniards ordered their lines and closed their fast thinning ranks! Did they have a doctor with them, or did the wounded lie in the hot tropical sun with no water or shelter until Death mercifully took them to himself?

Was there a brigade surgeon with the Conquistadores who explored this rugged land from the sea to the crests of its highest mountains? Did he ride in a litter carried by perspiring, heart-broken savages, or did he toil along at the rear of the column footsore, torn by thorns and cactus, and then when the weary column halted did a slave bathe him, or did he spend the night ministering to arrow or axe wounds and dressing the fiery ulcers that formed where the coats of mail chafed their wearers, and so continue from day to day? Who were his assistants?

Only men in all the word implies were members of these expedition, and where every one fit to bear arms was required as a fighting man, where did he find his helpers? Were they grateful Indians who re-

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<sup>1</sup>Read by title at the 30th Annual Meeting of the Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.

garded him as a miracle worker because he had cured them, or slaves too weak to be of any further use in the transport column?

The picture shifts. We see Sir Francis Drake landing at the mouth of the Jaina River with 1,000 men, and marching through the jungle to the city. The "Iron Coast" makes landing precarious, but it has been successfully accomplished. His bombardment of the city and its apparent failure and his withdrawal have lulled the Spaniards into a false sense of security. When a frightened messenger appears at the city's gate and says the English have landed and will soon be before the city, consternation reigns.

His words are soon verified, but the defense is feeble and the city capitulates. For twenty-five days Drake encamps his troops in the Plaza Colon and daily renews his demand for tribute and daily destroys part of the city to give his word weight. What tales this old plaza could tell of war and war's alarms!

Where did Drake have his hospital, and who was his brigade surgeon? Did the soldiers he carried in his fleet have their own doctors, or were they treated by the doctors attached to the ships if there were any such?

The scene again shifts, and we see Admiral Penn in an unsuccessful foray. Did his defeat mean that his wounded were abandoned, or were they returned to him in exchange? Who knows! And so the pictures flit across the screen. We can shift it a bit and see a brave French landing in Hayti. It is always successful in battle, but a deadlier foe than the revolting blacks attacks it. Yellow fever and malaria aid the blacks, and that army melts away like snow before spring showers.

Who were its medical officers, and what means to fight the enemy did they adopt?

From this time on revolutions occur from time to time. There are no roads, only trails over the mountains that tax the strength of a well man, so how do the sick and wounded fare?

There are few hospitals, and more than once the medical officers of friendly war ships lying in the ports extend timely aid.

This brings us down to the period of our occupation, and, profiting by the experiences of previous expeditions, the force came well prepared to cope with disease or battle casualties. As the expeditionary force was in the strength of a brigade, the medical detachment was organized accordingly, so now my purpose is to define the duties of its senior medical officer, "The Brigade Surgeon."

While the organization tables and regulations define a brigade as a tactical unit and not as an administrative unit, still, frequently "a



condition and not a theory" confronts us and the brigade is the maximum organization on the duty assigned. The brigade was organized for duty in the field and all necessary equipment taken.

Its duty in the field soon came to an end, and it was split up into detachments varying in size from a regiment to a sergeant's guard, and placed in garrison in the principal cities and strategic points. These garrisons are organized according to modern military ideas for the kind of duty they may be called upon to perform, and are most varied. They may be chasing bandits, in mapping details, or any other form of field or garrison duty the brigade commander deems necessary.

A brigade on independent service, as in the tropics, requires almost as extensive a staff as a division, for it must carry on the staff work of a division on a minor scale. This article deals with the duties of one of the members of this staff, the brigade surgeon, and of his duties with a brigade of marines on duty in the West Indies.

The duties of the brigade surgeon, as defined in "The Manual for the Medical Department of the United States Navy, 1917," are as follows:

The brigade surgeon will serve on the staff of the brigade commander. He will be held responsible for the efficiency of his department and from time to time make such suggestions and recommendations to the brigade commander relative to the same as the exigencies of the case may demand. When furnished with information regarding situation, it shall be his duty to study it and to take the initiative in preparing for and anticipating demands and emergencies in his department. He shall act upon his own responsibility when necessary to do so, reporting his action to the brigade commander for his approval. He shall submit plans beforehand whenever practicable. He shall keep records and notes of all events and matters of importance in connection with his duties, and to assist him in this duty he will have detailed as a member of the noncommissioned staff a chief petty officer (chief pharmacist's mate) or a pharmacist.

The brigade surgeon shall have general direction of all divisions of the sanitary personnel; the organization of the transport column and the reserve medical supply; evacuation of sick and wounded to the rear; and the organization of such field and base hospitals as the exigencies of the service may demand.

Many of our preconceived ideas must be modified by local conditions, and by the manner in which the troops are quartered, whether in barracks or under canvas.

When a brigade garrisons a territory of 18,000 square miles, different dispositions must be made for caring for its casualties than when its front is the extent of the regiments comprising it, and its depth from its firing line to its base in the rear.

The present organization of the medical department of a war strength brigade calls for 32 medical officers, 3 warrant officers and 190 enlisted personnel. In addition one marine officer, one marine warrant officer and 33 enlisted marines are assigned for duty with the Medical Department.

I would consider this admirable for a brigade actively engaged in the field. However, a marine expeditionary force acting as a friendly garrison will not be acting in the face of the enemy but will be broken up into units to suit local conditions, and more medical officers may be required and fewer hospital corpsmen.

The first-aid station is succeeded by the post dispensary, or field hospital, according to the size of the garrison, and personnel assigned accordingly.

Here is where the brigade surgeon begins to function:

1. He advises the brigade commander of the medical personnel at his disposal.

2. He finds out the posts to be garrisoned and the size of the proposed garrisons, and then recommends the medical personnel to be assigned to each.

3. Consults with the regimental surgeons as to the location of the regimental or field hospitals, and the personnel to be assigned, care being taken to see that a well rounded out service is established.

4. Sees that a proper and equitable distribution of the medical stores is made.

5. Establishes the base hospital of the brigade and assumes command unless some other medical officer is designated as its commanding officer.

6. Gets in touch with the sanitary authorities and learns the prevailing diseases.

7. Finds out from the same source the prevalence and varieties of venereal disease in the country, and cooperates with the provost marshal in the eradication of the same. Also notifies the regimental surgeons of any steps taken so they can cooperate.

8. Requires the regimental surgeons to report weekly the number of cases of venereal disease developing each week, its percentage, percentage for the previous week, its increase or decrease, and the methods in vogue for its eradication.

9. Requires that attention be paid to hygienic and sanitary details, and that all members of the brigade be given necessary preventive inoculations.

10. Notifies the regimental medical officers of any outbreaks of communicable diseases that are brought to his notice so that they may take the necessary steps local conditions may require.

11. Makes official inspections in company with the brigade commander and reports his findings to him in writing.

12. Keeps the brigade commander informed at all times of the medical and sanitary situation of the brigade and makes necessary recommendations to him.

13. Keeps the Bureau of Medicine and Surgery informed of the medical personnel on duty with the brigade, and by monthly reports of their stations and date of reporting for foreign service.

The same applies to the hospital corps personnel.

14. Requires that all reports and requisitions be forwarded through him and makes recommendations concerning the same.

15. When the brigade takes the field he assigns the personnel, sees that adequate stores are provided, and establishes the necessary field and base hospitals as are required. He also requisitions the necessary transportation.

Nothing must be left to chance. "An infinite capacity for details" on the part of the brigade surgeon and his assistants will make for the successful outcome and add to the comfort and well-being of the sick and wounded. In the field special attention must be paid to the food and water supply, and to the insistence of officers and men sleeping under their mosquito nets. Boiled water, well-cooked food and good mosquito nets will keep an expeditionary force in the tropics fit.

I have set down my conception of the duties of a brigade surgeon in the tropics. He will find his time fully occupied and the work pleasant. He will suddenly be confronted with cases of pernicious malaria that are hopeless from their onset. He will be notified in the night of cases of serious illness at some lonely outpost that is inaccessible to the ambulance owing to the character of the roads; he will have patients brought in from outlying stations by airplane and will send assistance by the same means.

And so the story goes. Will our successors in the future have the same problems to face, and will they wonder, as I have, over who their predecessors were and how they solved their problems?



# LABYRINTHINE REACTIONS IN SYPHILIS<sup>1</sup>

BY MAJOR WILLIAM F. BONNER

*Medical Reserve Corps, United States Army*

HOPING to find that syphilis caused a definite labyrinthine reaction, which would aid in its diagnosis prior to the presence of a positive Wassermann reaction in the blood, I was prompted to make a series of Barany tests (turning chair and caloric) on patients who were syphilitic. Dr. I. H. Jones, in his book, "Equilibrium and Vertigo," states that in the beginning stages of syphilis there is a progressive lowering in the amount of after-turning nystagmus. My observations did not show this. The average amount of after-turning nystagmus in syphilitics was practically the same as that stated in the Air Service Medical as found in normal cases by the Aviation Examining Units—about 23 seconds.

In new cases of syphilis examined from two weeks to eight months after contraction, the after-turning nystagmus ranged from 10 to 36 seconds, with an average of about 21 seconds. The cases which existed from one to three years had nystagmus of 11 seconds to 32 seconds, averaging 22 seconds. The old cases of three to thirteen years duration had nystagmus from 11 to 39 seconds, averaging 24 seconds. The longest duration of after-turning nystagmus was in a Wassermann-fast individual who had had the disease three years, 39 seconds after turning to the right and 31 seconds after turning to the left. There were cases of short duration of nystagmus in new cases, in cases existing one to three years and even in cases existing thirteen years.

My diagnosis of syphilis by means of the labyrinthine reactions has been accidental or secondary to the diagnosis of brain lesions. There were two cases with a lesion in the cerebello-pontile angle; both cases had a positive Romberg reaction and perverted nystagmus. In both the blood Wassermann was negative; the first had a positive Wassermann of the spinal fluid; the second had a negative spinal Wassermann but a typical parietic colloidal gold curve. An epileptic sent for examination showed abnormal reactions typical of a lesion of one of the cerebellar peduncles. The blood Wassermann proved to be positive. Another case, a known syphilitic, was sent with poor vision caused by a choked disc of the left eye. The labyrinths, on being tested, showed also a destruction of the labyrinth or eighth nerve on the right side.

In conclusion, the labyrinthine reactions are of little value in the diagnosis of syphilis, but should prove valuable adjuncts in the finding of brain lesions in this disease when used in conjunction with neurological and serological examinations.

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<sup>1</sup> Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.

# The Military Surgeon

*Published monthly and constituting two volumes annually.  
Volumes commence with the January and July numbers.*

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Entered as second-class matter January 22, 1916, in the Postoffice at Washington, D. C., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of October 3, 1917; authorized July 2, 1918.

Subscriptions \$4.00 a year for the United States. Elsewhere throughout the world \$4.50. Single copies 50 cents. Subscriptions payable in advance. Checks should be made payable to The Association of Military Surgeons, U. S., and not to any officer personally.

*The addresses of members and subscribers are not changed except upon request.* In every case the old as well as the new address should be given. Requests for change of address must reach the Secretary before the twentieth of the month to be effective for the following issue.

Original articles, items of news and matter of interest to the Services are welcomed. Requests for reprints should be made at the time of forwarding articles.

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## EDITORIAL

### THE PASSING OF THE PATELLA

"Simon says 'thumbs up, or thumbs down.'" The roaring crowd in the Roman amphitheater carried life or death to the vanquished gladiator by the same gesture. So in this, our day, Paul Poiret, Jennie and the other arbiters of feminine fashion in joyous Paris, the perennial center of the circumference of fashion, move not only their thumbs up or down, but with these dictatorial digits they make for abbreviated or elongated skirts which shall run only scantily to the Tropic of Capricorn of the female figure or descend to the ankle lengths of the far south latitudes.

The recent dicta of these "*arbitres elegantarium*" seem to carry silk, wool and cotton well toward the antarctic regions, thus putting into eclipse for the discriminating male eye somewhat that is worthy of approbation, and a modicum which, on account of *Genu Valgum*, or *Varum*, may be just as well veiled and left to a gravely speculative imagination—purely scientific, of course.

In the narrowing of this subtropical viewpoint there is one phase which mere man may accept with entire equanimity. That is the recession of the *Patella*, the knee, from a point of bold prominence. Ellis Parker Butler says that "Pigs is pigs." Equally so, "Knees is knees." No one will in any way attempt to attack them on the ground of strict utility. Speaking alliteratively, knees are necessary. But that is by no manner of means a concession to their pulchritude. We readily concede that they are a sort of isthmus, in the fair sex at least,

between contiguous continents of pleasing aspect. But, considered solely on their own merits, they have little to offer aside from the fact that they are quite indispensable to the human machine. Whether they be of the "housemaid" or other variety, they have only a very workaday function. Good to climb stairs with; useful (with the vanishing short skirt) in demonstrating ravishing hosiery and at times equally ravishing *gastrocnemii*, but *per se* merely frank bony knobs, covered by indulgent nature with a scant layer of epidermis as a concession to decency, a sort of thinly veiled apology for their existence. They are always at the mercy of bureau drawers, furniture hidden by the darkness of the night, and they antedated the 18th Amendment by centuries in their propensity, at the least irritation, to declare violently and generally obstinately for water, on them, or in them; and it does not make much difference which.

Not a great many years ago the advertisers of a very attractive and diminutive vaudeville star coined a phrase about "dimpled knees." All bunk. Nothing to it at all save that the pulchritude of the charming lady might hypnotize anyone into believing that her knees were on a beauty parallel with her face and general winsomeness. But that was entirely false reasoning; *a priori*, maybe, although we are not very certain of our law. Considered as essentially separate entities we still contend that "knees is knees," just plain bony hinges put in for a purely materialistic purpose. You cannot improve them by powder or rouge. They stand knobbily and plainly as exponents of the fact that there must be certain utilitarian factors in a general fascinating makeup. To roll stockings down below them attracts attention not to them, but to contiguous territory.

Therefore, if we have any regrets that the changing vagaries of fashion have lengthened the veil, let us not sigh that the patella has gone into eclipse, but that with its occlusion we have lost sight of more attractive adjuncts.

J. R. C.



## COMMENT AND CRITICISM

### CHATTANOOGA MEETING OF THE SOUTHERN MEDICAL ASSOCIATION

The Southern Medical Association will hold its sixteenth annual meeting in its birth city, Chattanooga, Tennessee, "The Dynamo of Dixie," Monday, Tuesday, Wednesday and Thursday, November 13-16, 1922; Dr. Seale Harris, Birmingham, Alabama, President.

This meeting will be made up of eighteen sections and conjoint meetings as follows: Section on Medicine, Section on Pediatrics, Section on Neurology and Psychiatry, Southern Gastro-Enterological Association, Section on Radiology, Section on Dermatology, Section on Surgery, Southern States Association of Railway Surgeons, Section on Urology, Section on Orthopedic Surgery, Section on Obstetrics, Section on Eye, Ear, Nose and Throat, Section on Public Health, National Malaria Committee, Conference of Malaria Field Workers, Southern Hospital Association, Conference on Medical Education and Southern Association of Anesthetists. In these meetings every phase of medicine and surgery will be treated. The programs are unusually fine this year.

Dr. E. D. Wise, City Health Officer of Chattanooga, will deliver the Address of Welcome, which will be responded to in behalf of the Southern Medical Association by Dr. W. S. Leathers, State Health Officer of Mississippi, Jackson, Mississippi. Dr. C. C. Bass, Dean of Tulane Medical College, New Orleans, will deliver the Oration on Medicine; Dr. Hubert A. Royster, Raleigh, North Carolina, the Oration on Surgery; and Dr. S. W. Welch, State Health Officer of Alabama, Montgomery, Alabama, the Oration on Public Health.

Of unusual interest will be the joint dinner session of the Section on Surgery and the Section on Radiology, Tuesday night. Dr. George W. Crile, Cleveland, Ohio, will represent the Section on Surgery, and Dr. George W. Holmes, Massachusetts General Hospital, Boston, the Section on Radiology. All physicians and surgeons are cordially invited to this dinner session.

Entertainments include a president's reception with dance on Tuesday night and a dance and get-together meeting on Wednesday night. On Tuesday and Wednesday elaborate entertainments have been provided for the wives of the physicians, including sight-seeing

trips over the historic points of interest, luncheon at Signal Mountain Inn, theater parties, etc. The Chattanooga Committee is anxious for a large attendance of ladies.

For those who golf, tournaments are being arranged. Chattanooga has several wonderful golf courses.

Scientific exhibits bid fair to be of unusual interest. In the health exhibits malaria control work will be featured. In connection with the scientific exhibits there is expected to be a moving picture theater at which scientific films will be featured all during the days of the meeting.

Chattanooga excels in beautiful scenery and in points of historic interest. Lookout Mountain, Signal Mountain, Missionary Ridge and the historic battlefields alone are worth a trip to Chattanooga.

The Hotel Committee promises comfortable accommodations for all who attend.

Special reduced railroad rates have been granted by all railroads on the certificate plan. The members of the association will receive without applying for them a certificate entitling them to reduced rates. Any doctor who is a member of his state and county medical society, although not a member of the Southern Medical Association, who desires to attend this meeting can have the benefit of these reduced rates by requesting a certificate from the association office.

### THE SANTIAGO CAMPAIGN

In the September issue of *THE INFANTRY JOURNAL* appears an address by Brig. Gen. E. J. McClermand, U. S. Army, Retired, which was delivered before the Society of the Army of Santiago de Cuba at the Army and Navy Club, Washington, February 25, 1922.

From his status as adjutant general to General Shafter in command of the 5th Army Corps, General McClermand is in position to speak authoritatively and interestingly on the campaign against Spain in Cuba in 1898 which resulted in the expulsion of Spanish power from that island.

While General McClermand's address does not deal particularly with medical conditions during the Cuban Campaign, it is interesting because it brings to light the adversities under which the 5th Corps labored from unpreparedness and lack of practice, and further because it gives a measure of comparison between the warfare of twenty-five years ago and that of today under advanced and improved conditions. The paper is well written and should be of interest not only to those who participated in this campaign, but to others who are historically interested in campaigns in general.



This address has been published under separate cover by the Infantry Association and copies of it may be obtained from Col. Charles A. Williams, U. S. Army, secretary and treasurer of the Society of the Army of Santiago de Cuba. His address is The Ontario, Washington, D. C. The price of these reprints is 25 cents each.



## BOOK REVIEWS

A MANUAL OF CLINICAL LABORATORY METHODS, by Clyde Lottridge Cummer, Ph.B., M.D. Illustrated with 136 engravings and 8 plates. Pages i-xviii, 17-484. Philadelphia and New York: Lea and Febiger, 1922. Price, \$5.50.

This work upon clinical laboratory methods by Cummer is one of the best on the subject that the reviewer has read. It is divided into seven chapters and an appendix, the subjects considered being the examination of the blood; the examination of the urine; the examination of gastric and duodenal contents; the examination of the feces; the examination of sputum; examination of body fluids, exudates and miscellaneous methods, and bacteriological methods.

The chapter upon the examination of the blood is especially full and up to date and can be cordially recommended to every student and practitioner of medicine. The reviewer has gone over this chapter very carefully and believes that it is one of the best presentations of the subject in any English book upon laboratory or diagnostic methods. The methods of examination are well selected and described in such a manner that no one can fail to understand them. The chapters upon the examination of the urine and gastric and duodenal contents are also very accurate and cover the ground excellently, but the same cannot be said of the chapter dealing with the examination of the feces, especially that portion relating to intestinal parasites, in which the descriptions of the various important parasites occurring in this locality are very sketchy and unsatisfactory. In this respect, however, Cummer's book is no exception to the general rule that obtains in practically every book upon laboratory diagnosis or clinical diagnosis written by American or English authors. Almost without exception they fall far short of what they should be in the chapter upon the examination of the feces, especially in the discussions of the animal parasites of the human intestine. This is very largely due to the fact that the importance of an examination of the feces in clinical medicine is only just beginning to be recognized, and not until the profession demands a better treatment of the intestinal parasites in our textbooks upon clinical diagnosis and laboratory methods will this subject be adequately discussed in our standard works upon these subjects.

The chapters upon the examination of the sputum and of body fluids and exudates are excellent, as well as that upon bacteriological methods, although the latter could be expanded without injury. There is a useful index, and the work is well printed and bound. The illustrations are good and most of the color plates excellent. The book can be recommended as a trustworthy guide on laboratory methods which are especially applicable in the clinical laboratory, as its name indicates.

CHAS. F. CRAIG, M.D.

BACTERIOLOGY: General, Pathological and Intestinal, by Arthur Isaac Kendall, B.S., Ph.D., Dr. P.H. Second edition, thoroughly revised. Illustrated with 99 engravings and 8 plates. Pp. i-xi, 17-680. Philadelphia and New York: Lea and Febiger, 1922. Price, \$6.

The second edition of Kendall's bacteriology has been thoroughly revised and greatly enlarged and may be recommended as one of the best works upon the subject in the English language. It is divided into five sections: Section I, treating of general bacteriology; Section II, of Pathogenic bacteria; Section III, of the higher bacteria; Section IV, of gastro-intestinal bacteriology; and Section V, of applied bacteriology.

Section I very adequately covers the morphology, physiology, chemistry, metabolism and cultivation of bacteria and the subjects of immunity and infection, antigens and the

technique of serum reactions, anaphylaxis, allergy and hypersensitiveness, and practical sterilization, antisepsis and disinfection. This section covers 251 pages and is a well-balanced discussion of the various subjects of which it treats.

In Section II, covering nearly 300 pages, the various pathogenic bacteria are discussed *in extenso*, and this portion of the work can be commended for its accuracy of statement and excellent descriptions of the organisms considered. A careful reading demonstrates that the author is thoroughly acquainted with the recent literature of his subject and that he has included a great part of the recent observations of moment in his descriptions. The chapter upon the anaerobic bacteria is especially valuable because of its completeness and scientific classification of the various bacteria belonging to this very important group.

In Section III is included a discussion of the higher bacteria, the filterable viruses and diseases of unknown etiology. It is the least satisfactory in the book, not because of inaccuracy of statement but because of the inadequate treatment of most of the subjects. This chapter only covers 46 pages, a space falling very far short of sufficient for a really scientific and worth-while discussion of the numerous higher bacteria and the important group of infections due to filterable viruses and of unknown etiology. It is noted that typhus fever is placed among the diseases due to a filterable virus although the evidence now is absolute that the virus of typhus is not filterable, in the opinion of the best authorities and students of this infection.

Section IV contains a general discussion of gastrointestinal bacteriology, and Section V is devoted to the bacteriology of milk, soil, water and air. This section contains nothing new and, in the opinion of the reviewer, could be greatly enlarged with advantage, as the discussion of the bacteriological examination of water, in particular, is very brief and of little value to the practical water bacteriologist.

However, as already stated, this book is one of the best in English upon general bacteriology and contains much material that will not be found in other works upon the subject. It is excellently bound and printed, and well illustrated.

CHAS. F. CRAIG, M.D.

**INDIVIDUAL GYMNASTICS.** A Handbook of Corrective and Remedial Gymnastics, by Lillian Curtis Drew, Director of Department of Corrective Gymnastics, Central Branch Y. W. C. A., New York City; Instructor in Corrective and Remedial Gymnastics, Central School of Hygiene and Physical Education; Formerly Director of Department of Corrective Gymnastics, Teachers' College, Columbia University, New York City; Instructor in Corrective Gymnastics under the Direction of Dr. E. H. Bradford, Boston, and E. G. Brackett, Boston. 8°, 225 pages, with 100 illustrations. Philadelphia and New York: Lea & Febiger, 1922.

All Americans (like Gaul) are divisible into two groups—those who exercise physically and those who do not. The first of these groups may be further subdivided into (a) those who take rational daily exercises and receive rational benefit therefrom, (b) those who over-exercise spasmodically and give their muscles as little activity as possible in the interim, and (c) professional and amateur athletes to whom physical training is essentially a preparation for contest. The members of this first subgroup comprise a small but—let it be hoped—increasing proportion of our population, young and old. Among them are to be found in certain numbers persons who have previously belonged to one of the other subgroups, and who, with an intelligent realization of the error of their ways, have instituted for themselves a really rational reform. In the second subgroup are to be found individuals who upon occasion dance continuously from a late dinner to an early breakfast once, twice or thrice per month during the “social season,” or who, having seen Annette Kellerman at the Hippodrome or on the screen during the course of an evening’s

entertainment, determine firmly to discard the 50 or more pounds of superfluous adipose tissue with which their skeletons are adorned and develop in record time a "sylphiness" comparable to that of the diva of the diving tank.

The sex of a considerable proportion of these particular persons needs no further definition, though it is even true that an occasional male—it is hardly appropriate to call him a man—is stimulated to similar temporary physical ambition to broaden his narrow shoulders and deepen his shallow chest by contemplation of the athletic heroines of the day either in the flesh or cinematographically. Such individuals, male and female, persist strenuously in their good (?) resolution for an exhausting number of hours in one day—at the most a week—and proceed then to sink sighingly back into their previous state of innocuous lethargy. The physical benefit which comes to these poor victims through such spasms of attempted virtue is a minus quantity. At the best they so fatigue themselves physically and nervously that they require several days to recover their normal—more properly their usual—condition of body and mind. At the worst they may bring on an attack of decompensation in a heart already crippled by disease but which in the ordinary course of circulatory events manages to perform its functions in a fairly satisfactory manner, or may so lower their resistance as to allow the establishment in various parts of the body of pathological processes depending for their parasitic cause upon previously existing focal infection.

Upon professional and amateur athletics many physiological reproaches have been cast. Of college athletics in particular it has been often and truly said that they exist, at least in the form of football, baseball, rowing, and track sports, for the benefit of those few who are physically best endowed and, therefore, who least need the especial training involved, and that they omit from consideration the physical inefficiencies of the great mass of the student body. This criticism has in times past been justly deserved, but in later years efforts to correct the conditions complained of have been made by practically all institutions of higher education in America. A certain amount of gymnasium instruction is today required of all college students. In many institutions the fact of having "qualified" in swimming is a prerequisite to graduation. But of late a further advance in the matter of physical training has been made at the United States Military Academy under the superintendency of General Douglas MacArthur. All cadets, in addition to the previously required physical training, now receive instruction in the various forms of sport in which the institution engages in contests with the Naval Academy and civilian colleges. Each cadet, therefore, is trained not only in equitation, swimming, boxing, wrestling, fencing, and setting-up exercises as formerly, but he participates also as a part of his curriculum in football, baseball, track athletics, hockey, tennis, and the other forms of sport wherein in times past West Point's participation was limited to its representation by the various teams selected from the most proficient members of the corps of cadets. This innovation, carefully regulated and supervised through the medium of adequate instruction, would seem to approach quite closely to the ideal of giving to all members of the student body the benefit of all the athletic activities of the institution.

Another aspect of professional and amateur athletics which concerns the individual participant has certain deplorable consequences that cannot be so easily avoided. The intensive training required of the champion pugilist and which the members of winning football teams and crews must undergo, is apt to leave behind certain potential injuries which may even for considerable periods of time be masked by a magnificent musculature, but which in the course of years may lead to relatively early degeneration and death. Thus, the cardiac hypertrophy of the athlete, while a source of strength during the period of training, may later be a factor—even a determining factor—in the production of a chronic myocarditis. The persistent elevation of blood pressure which accompanies a football

game or eight-oared race and the training incident to preparation for these contests, will assuredly leave its scars in the kidneys and arterial walls of some, if not all, of the participants. And more particularly is this true, if these men, as is often the case, discontinue upon graduation from college their regular habits of life and of physical exercise to which they so willingly submitted as the price of athletic glory in undergraduate days. How pathetic a spectacle is that of the former football deity, gone to seed, who returns in later years with his bald head, his pendulous abdomen, his premature arcus senilis, and all the other stigmata of approaching senility, and who walks limpingly and wheezingly out to view the scene of his former triumphs! Yet many athletes of renown find themselves in just such a physical plight by the time they reach middle life. In general it seems true that intensive and excessive muscular activity during youth tends to a relatively early physical decay with all the complications of low-grade cardiac myopathy, arteriosclerosis, chronic renal lesions, etc.

From all of which we may again deduce the old lesson that moderation in all things, even the best of things, is the desired optimum. And any propaganda which seeks to induce both those who exercise and those who do not to embark upon a course of sane, rational, intelligently supervised, and carefully moderated physical training for health's sake is to be supported and commended by all physicians and physiologists. This propaganda is well under way in the United States. It has received a decided impetus in the minds of sanitarians and sociologists as a result of the really appalling number of physical defectives who were rejected because of their defects by the draft boards (and later by boards of medical officers at the various concentration camps) when America was mobilizing her man-power for participation in the European war. As elements in this propaganda there are appearing not a few books written by those who have had extensive practical experience as instructors in physical training and who have acquired such knowledge of anatomy, physiology, and hygiene as is essential to enable them most efficiently to adapt their athletic prescriptions to the needs of the individual under instruction. Among these books, that whose title appears as the caption of this review is one of the best. Its writer—if we may judge from the positions she holds—is exceptionally well qualified to speak with authority upon this subject so far as it particularly concerns women and children. The book grasps the fundamental principle that physical training has a psychological side of the utmost importance. In exercise not only the body, but the mind as well, must be actively employed. Muscular movements executed in an unthinking routine manner lose much of the value which we seek to derive from their employment. Exercise to be of the greatest possible benefit must be of such a nature as to keep the mind alert and to awaken in the individual some pleasurable sensation. It is for this reason that the "sports" appeal with so much more force than do the so-called "setting-up exercises" which, if they constitute the only exercise in which one indulges, are apt to lead to a condition of mental staleness and thus become relatively unprofitable. Miss Drew introduces her little work by a word on the psychological side of gymnastics both from the standpoint of the instructor and the pupil. A short chapter on anatomy and physiology is followed by a very clear, concise, and altogether teachable discussion of faulty postures, the evils to which they may lead, and the physical methods of their correction. This section of the book is followed by a short chapter on visceroptosis and a long one on scoliosis with especial reference to the treatment of that deformity. These two sections of the book would seem to indicate a very thorough familiarity with the tenets of Dr. Joel E. Goldthwaite and the gentlemen associated with him concerning deformities and faulty posture in their relation to disease. Chapters 10 and 11 deal with abnormal conditions of the foot and their correction. The work is concluded by short chapters on infantile paralysis, constipation, dysmenorrhea, and disproportionate weight.

This little book, concerning which any grounds of adverse criticism are difficult to find, should be extremely useful to two classes of people,—those who, like the author, are engaged in physical culture teaching, and the intelligent laymen and laywomen who seek succinct and well-coordinated directions for physical exercise and the conditions which it is calculated to overcome or ameliorate.

A. N. TASKER,  
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HUGHES' PRACTICE OF MEDICINE, Including a Section on Mental Diseases and one on Diseases of the Skin, by R. J. E. Scott, M.A., B.C.L., M.D., Fellow of the New York Academy of Medicine; Fellow of the American Medical Association; Author of "The State Board Examination Series"; Editor of "Witthaus' Text-book of Chemistry," "The Practitioner's Medical Dictionary," etc. 8°, 12th edition, 810 pp. with 63 illustrations. Philadelphia: P. Blakiston's Son & Co., 1922.

This compact and concise work on the practice of medicine, of which the twelfth edition has just been issued from the press of P. Blakiston's Son & Co., has for long years been a *vade mecum* to the busy practitioner and especially to the medical student and recent graduate engaged in preparation for examinations of various and sundry sorts. Up to and including the sixth (?) edition the work was known as a "Compend of the Practice of Medicine," and it still maintains some of those characteristics of a manual or compend which are not met with in the ordinary textbooks on the practice of medicine, and which are of very definite value to the undergraduate. More particularly is this true of the very first pages wherein appear a considerable number of concise definitions and brief discussions. "The Practice of Medicine," "Disease," "Pathology," "Pathogenesis," "Lesions," "Etiology," "Infection," "Infestation," "Koch's Postulates," "Predisposing causes," "Inherited predisposition," "Acquired predisposition," "Exciting causes," "Enemic," "Epidemic," "Pandemic," "Sporadic," "Morbid anatomy," "Histopathology," "Histology," "Hematology," "Bacteriology," "Clinical history," "Symptomatology," "Period of incubation," "Pathognomonic symptoms," "Acute disease," "Subacute disease," "Chronic disease," "Physical signs," "Complications," "Sequels," "Diagnosis (direct, differential, by exclusion)," "Prognosis," "Treatment (prophylactic, curative, expectant, palliative, restorative)," "Termination," "Lysis," "Crisis," "Asthenia," "Anemia," "Apnea," "Coma," are all defined and briefly discussed. A short paragraph on "Terminology" indicates the meanings of the suffixes and prefixes "itis," "rheoa or rhea," "algia," "aemia or emia," "uria," "oma," "pathy," "hydro," "pneumo," "peri," "para." The general subject of fever is referred to somewhat in detail and a table is given which indicates the minimum, maximum, and average duration of the fever in twenty-six different infectious diseases. "Eruptive Fevers," "Exanthemata," "Immunity," "Jaundice," "Notifiable diseases," and "Communicable diseases" are defined and briefly discussed; a list of the notifiable diseases in New York City is given; and there appear two tabulated statements showing (a) "The time or appearance of eruption," "character of eruption," "duration of eruption," "location" and "desquamation" in cerebrospinal meningitis, erysipelas, measles, Röteln, scarlatina, typhoid fever, typhus fever, varicella, and variola; and (b) the "Cause and source," "incubation period," "mode of transmission," "period of communicability," "laboratory diagnosis," "salient clinical features," and "modes of control and remarks" of cerebrospinal meningitis, chicken pox, diphtheria, German measles, measles, mumps, poliomyelitis, scarlet fever, smallpox, and whooping cough.

From this point onward the book begins to resemble much more closely the larger textbooks on the practice of medicine. Thus we find on page 13 the caption "Specific infectious diseases, Diseases due to bacteria, Typhoid fever."

In discussing the etiology of influenza it is stated that "The affection is induced by an extremely small, nonmotile microorganism, the bacillus of Pfeiffer, which is readily obtained from the sputum." This statement is at variance with the conclusions arrived at in recent years by certainly the great majority of observers who have made the etiology of this disease their special problem during the pandemic which still remains fresh in memory. This question has been previously referred to in these columns in a review of "Influenza; Essays by several authors," edited by F. J. Crookshank, M.D.

No mention is made of the treatment of pulmonary tuberculosis by artificial pneumothorax, concerning which much is being read in the medical literature of the day.

It is regrettable that the author did not succeed in catching a specimen of *Leptospira icteroides* to insert in the paragraph on the causation of yellow fever. He says, "The disease is in all probability caused by an ultramicroscopic organism which has not yet been determined." Nor does he refer to Noguchi's anti-serum anywhere in the discussion of this disease.

No mention is made of the later serological methods employed in the diagnosis of syphilis, such as the agglutination reaction of Sachs-Georgi and Meinicke. A rapid survey of the pages on the treatment of syphilis fails also to reveal any reference to the treatment of this malady by bismuth and its compounds, concerning which a great mass of literature has recently appeared.

The etiology of epidemic jaundice is put down as "Unknown. The latest view is that the disease is caused by a spirochete—The *Spirochaeta uodosa*." References in current literature seem to indicate that most investigators who have concerned themselves especially with this disease accept *Leptospira icterohaemorrhagiae* today as the specific cause of Weil's disease.

The section of "Diseases due to metazoa has kept up better than is usually the case in similar works with the changes in zoological nomenclature. *Trichocephalus dispar*, however, has for some time been known as *Trichuris trichiura*.

Under the diagnosis of poliomyelitis there appears no mention of lumbar puncture and the examination of the cerebrospinal fluid,—certainly one of the most important diagnostic procedures in this particular affection. Spinal puncture, with consequent relief of pressure, came also to be looked upon in 1916 by many clinicians as one of the most efficacious of all available therapeutic measures, if employed early in the acute stage.

With reference to beriberi the disease is ascribed without qualification to "lack of vitamins or accessory food factors," and a pitying reference is made to the fact that "there are still some who believe that the disease is an infection, the specific organism of which is undetermined."

The etiology of abscess of the liver is thus described: "The exciting causes are pathogenic bacteria, particularly *ameba coli*, *colon bacillus*, *staphylococcus*, and *streptococcus*." "*Ameba coli*" is—and has for a long time been included in the genus "*Endamoeba* (or *Entamoeba*)" of the parasitic amoebae, and is thus known as "*Endamoeba* (or *Entamoeba*) *coli*"; it is not pathogenic, but a harmless commensal; the disease-producing endamoeba is "*Endamoeba histolytica*"; all amoebae, parasitic or free living, are protozoa and not bacteria. No mention is made of the emetine treatment of the presuppurative hepatitis due to *Endamoeba histolytica*, or to the post-operative treatment of hepatic abscess with emetine irrigations.

In the diagnosis of exophthalmic goitre there has been included no reference to the very important and valuable information furnished by a determination of the basal metabolic rate. It is hardly conceivable that any well-informed physician of the present day would fail to have made such investigation of any patient in whom he suspected an incipient hyperthyroidism, provided the necessary laboratory facilities were available.

Under "Diseases of the circulatory system" a brief reference to the instruments of precision used in examination of the heart and diagnosis of circulatory diseases is found on page 453, where it is stated "An examination of the pulse, auscultation of the heart, and the use of the sphygmograph determine the arrhythmia." In a rapid survey of this section of the book no reference was found to electrocardiography, nor does the word appear in the index. Again, no mention seems to be made of auricular fibrillation, and this term does not appear in the index under the headings "Heart," "Auricles," or "Fibrillation." Auricular fibrillation is receiving a considerable degree of attention in other current medical writings.

The discussion of hay-fever contains no reference to the cutaneous methods of diagnosis (by which the particular susceptibility of the individual patient is determined) or to the prophylactic use of pollen extracts, unless the one sentence "Dunbar's pollantin has been found beneficial in some cases," be held to be an exception.

An important therapeutic measure in the treatment of laryngeal oedema, viz., the hypodermic administration of adrenalin, is not found in the discussion of this subject.

The drug luminal, now much used in the treatment of epilepsy, is accorded no place in the therapy of that disease.

But enough! While it is true that certain errors and omissions are to be noted in a careful examination of this little work; yet it has many points of excellence. It recalls the old canny, bedside diagnostician and clinician, who arrived very surely at logical conclusions by direct observation and examination of his patient before the day of our present machine-made methods of diagnosis. The clinical laboratory, the electrocardiograph, the sphygmomanometer, and other methods and instruments of precision have tended, very unfortunately, to rob the medical profession of that earlier diagnostic acumen that was developed through long years at the bedside. Too many diagnostic conclusions are today arrived at without proper and thorough physical examination, and solely upon the basis of mechanical information furnished—or not furnished—by the adjuncts to the practice of medicine above referred to. To all those who deplore this tendency in diagnosis Dr. Scott's book is refreshing. Another element, as unusual as it is welcome to the medical student and recent graduate, is the long list of excellent prescriptions which accompany the therapeutic discussion of most diseases. In this restricted sense the work becomes a manual of the practice of medicine in much greater measure than can be claimed for any other similar work. This little book has been a favorite and valuable source of information during many years past to students and practitioners, and there need be no hesitancy in predicting that it will continue so to be.

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LES OCCLUSIONS AIGUES ET SUBAIGUES DE L'INTESTIN. Clinique, Expérimentation, Thérapeutique: Par A.-C. Guillaume. 1 Vol. de 304 pages avec 21 figures (Masson et Cie, Editeurs). Paris, 1922.

Of all the acutely critical surgical conditions to which the abdomen and its contained viscera fall victim, perhaps none is at present more disturbing to the surgical diagnostician and operator, or contains greater elements of serious danger to the patient than intestinal obstruction. Even in hospital practice—and that, too, in the very best of hospitals—the mortality from this condition has been for a long time, and still remains, between 40 and 50 per cent. A few serious cases, seen early and operated promptly by the surgeon, have bettered this figure in certain measure, but the general fact nevertheless remains that intestinal obstruction is still in the forefront of fatal abdominal involvements when considered by and large.



It is in the very nature of things that a malady of such grave potential consequences should have been the theme for many medical writers, and that from their pens should have come numerous discussions of all phases of the subject. In the 304 pages which comprise Dr. Guillaume's volume on "The Occlusion of the Intestine" he has grouped a great number of these discussions into one analytical study of the clinical aspects and pathogeny of the condition, has added to this the results of a considerable number of experimental investigations, and has brought together the information derived from these two methods of approach into a physico-pathological concept of the condition, upon the basis of which he submits an explanation of the mechanism of intestinal obstruction and gives a critical survey of the therapeutic measures of choice.

The individual chapters of the book under discussion, which, incidentally, are illustrated by numerous diagrams and photographic reproductions, are devoted to: "The general pathological anatomy," "The clinical picture and the particular forms of intestinal obstruction," "Prognosis," "Diagnosis," "Experimental pathology of the condition," "The mechanism by which intestinal obstruction takes place and by which death occurs in the course of such obstruction," and "The medical and surgical methods of treatment."

With such an arrangement this monograph constitutes both an analytic and synthetic study of acute and subacute obstruction of the intestine, and affords a very definite basis for discussion of the therapeutic measures. The description of the clinical manifestations bases itself upon the analysis of a large number of recent cases held under observation, in which particular facts and various forms of the malady have been investigated or in which certain elements common to the various modalities of ileus have been studied. Graphic charts made up from an analysis of more than seven hundred cases of obstruction and two hundred cases of strangulated hernia present a comparative study of the various factors that may influence the prognosis, and at the same time they indicate the results of investigations into the circulatory and urinary disturbances, as well as disturbances of the visceral functions, in the course of an obstructive attack. Finally, the results secured through the employment of a large series of diagnostic measures—more particularly those in which the Roentgen ray was made use of—indicate what may be expected from the application of such diagnostic procedures to the study and investigation of individual cases.

In this series of researches Dr. Guillaume points out the important role played by intoxication of intestinal origin and by the postoperative absorption of toxins in the mechanism of obstructive crises and of their fatal termination. From this point the author is led to a critical review of the methods of treatment in which he insists especially upon the absolute necessity of the early and direct evacuation of the intestinal contents.

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SYPHILIS, PALUDISME, AMIBIASE. *Le Traitement d'attaque et les traitements secondaires* (preventif, abortif et d'entretien). Par le Dr. Paul Ravaut, médecin de l'Hôpital St. Louis. Préface du professeur Fernand Vidal. 2d édition refondue, 1 vol. de 214 pages. (Masson et Cie, Editeurs.) 8 Paris, 1922.

This little volume is introduced by a preface from the pen of Professor Vidal, whose fame is so well established as to secure an attentive examination for a work to which he chooses to lend his name in any capacity.

The first edition of "Syphilis, malaria and amebiasis" appeared during the course of the World War, and was widely used as a manual for reference and guidance by many medical officers of the various armies to whose lot fell the task of the control and treatment of the three diseases whose names constitute the title of this review. The treatment

of syphilis, malaria and amebic infestation has been rendered inestimably more efficacious as a result of the introduction of the various specific therapeutic agents that the medical profession now possesses as elements available for use in its conflict with the causative parasites of these maladies, and the actual power—if one may use the term—of the physician who knows how to make use of these remedial agents intelligently and expertly is correspondingly greater than in the days before their discovery.

Long experience indicates that there is a certain analogy between the therapeutic measures to be employed against all three of these affections. Intensive and aggressive treatment with immediate eradication of the disease, if possible, at the very beginning of the case should constitute the first therapeutic attempt; less intensive treatment aiming to maintain the advantages secured comes later as a necessary complement.

The preventive and operative treatment of the infestations considered are outlined at the beginning of each of the three subdivisions of the book, and the author then proceeds to set forth all the details of the pharmacology, of the indications, dosage, methods of administration, and instrumental technique that should be employed in the treatment of each malady, and which make it possible to give to the patient assurance that he will receive all the benefit that may accrue to him from the most efficacious measures of therapy that have been placed in the hands of the medical profession. It is an essentially practical work, which might well be found in the library of every physician into whose practice the treatment of these diseases enters in any considerable measure.

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LES FAUSSES APPENDICITES, Étude clinique, radiologique et thérapeutique: Par les Drs. Thierry, de Martel et Edouard Antoine. Preface du Dr. Bensaude. 1 volume de 184 pages avec 29 figures et 10 planches. (Masson et Cie, Editeurs.) Paris, 1922.

In this very clear and well-arranged little manual the authors take under consideration those abnormal conditions of the right side of the abdomen which cause pain. No general surgeon, no gastro-enterologist needs to be told how complex this subject is. In a certain number of instances, of course, a subacute or chronic appendicitis is at the foundation of the whole matter; but on the other hand it is frequently the case that the diagnostician finds himself face to face with morbid changes much more complex, mechanical rather than inflammatory in their nature, the cardinal symptom of which is pain in the neighborhood of the caecum and ascending colon.

Dr. Antoine has done a very original and useful piece of work in bringing together descriptions of all those isolated conditions that have been outlined in recent years and in adding thereto some of his own personal experiences. He emphasizes the fact that, whatever may be the fundamental nature of these morbid states, they are all translated symptomatically into "a painful syndrome of the right iliac fossa and of the right flank." He classifies from a clinical standpoint three groups of such conditions; these, viewed according to their severity, range from slight disturbances to those most serious crises that so frighten a patient as to lead him to have recourse to the surgeon. Clinical examination alone does not suffice to determine with exactitude the causative factors in these painful attacks. With the aid of roentgenography and the various haematologic procedures the clinician should be finally able to refer the symptoms complained of either to an abnormally mobile caecum, to a caecum prolapsed into the pelvis and there adherent, to a complete ptosis of the ascending colon, to a partial prolapse of the hepatic flexure of the colon, to a Jackson's membrane, to a "perivisceritis" of the transverse colon, or to other abnormal conditions of the colon, of all of which there will be found in the pages of this work a detailed description.

Dr. de Martel indicates the line of operative treatment which should be pursued by the surgeon in handling these maladies of the caecum and ascending colon. Above all he insists upon the necessity of conservatism, and urges upon the operator that he should confine himself, at least primarily, to "restorative operations" of the simplest possible nature, producing as little as possible of actual mutilation of the abdominal structures. He believes that in a large majority of cases such conservative surgery as this will give the best results, and that a considerable proportion of those patients who are operated according to these principles will be returned to a state of perfect health. But in certain cases adhesions will form again, or conditions in and about the caecum will be found too severe and too extensive for so conservative a method of treatment, and it will then be necessary to perform some short-circuiting operation (ileotransversotomy, ileosigmoidostomy). Finally, in those severest cases in which later there is a stasis of intestinal contents and of gas in the segment that has been excluded, it will be necessary to take under consideration the advisability of doing a partial secondary colectomy.

The printed text is accompanied by several roentgenographs and other illustrations which play an important part in illustrating the classical methods of treatment in diseases of the gastro-intestinal tract.

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ÉTUDES NEUROLOGIQUES: Par le Dr. G. Guillaín, professeur agrégé à la Faculté de Médecine de Paris, médecin de l'Hôpital de la Charité, membre de l'Académie de Médecine. 1 volume de 470 pages avec 18 figures et 4 planches hors texte. (Masson et Cie, Editeurs.) Paris, 1922.

The professorial position occupied by Dr. Guillaín in connection with the Paris Faculty of Medicine makes it an assured fact that whatever comes from his pen will receive respectful attention at the hands of all members of the medical profession who devote themselves to the specialty concerning which he writes.

The author has brought together in this one volume a series of neurological studies conducted by himself. In them he has introduced to the notice of his colleagues certain new principles in the matter of semeiology and nosography. These studies deal with numerous and varied subjects having to do with the pathology of the brain, medulla, the cranial and spinal nerves, and the meninges; but throughout the whole work there is to be discerned one central idea, which is that the pathology of the nervous system and its constituent parts must in the last analysis be correlated with that of the whole body, and must be inquired into in accordance with all the principles of diagnosis laid down in connection with general pathology. While it is in no sense even a matter of argument that the anatomy and physiology of the nervous system must be considered as the fundamental basis of all neurologic knowledge, and that it is essential in the treatment of nervous diseases to have always in mind the anatomy and physiology of this system (which constitutes a sort of directorship over the whole bodily economy) nevertheless modern neurology must also recognize the necessity of calling to its assistance all those measures of diagnostic procedure—bacteriological, physical and chemical—which, in the progressive development of the art and science of medicine as a whole, have brought into view so many new horizons.

The individual chapters—or rather studies—contained within the covers of the volume whose title appears at the head of this review concern themselves with "The fixation of poisons in the nervous system," "Diseases of the brain," "Diseases of the medulla oblongata," "Syphilis of the nervous system and its component elements. Tabes," "Diseases of the cranial and spinal nerves," "Muscular atrophy," "The cerebrospinal fluid and

lumbar puncture," "Diseases of the meninges," "Encephalities lethargica," and "Intoxications."

Each chapter, or study, deals in a complete and well rounded manner with the subject which constitutes its title, giving clearly and concisely the methods of diagnosis, the symptomatology, and the treatment. While presumably written for the information of other neurologists, none the less the subjects are not treated with so much technical detail that they are beyond the scope and understanding of those general practitioners and specialists in other branches of medicine whose contact with neurology is that casual one which each specialty has with every other specialty.

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THE PLACE OF VERSION IN OBSTETRICS: by Irving W. Potter, M.D., F.A.C.S., Buffalo, New York; Obstetrician-in-Chief, Deaconess Hospital and St. Mary's Maternity Hospital; Attending Obstetrician, City Hospital; Consulting Obstetrician, Columbus Hospital, Buffalo Homeopathic Hospital, and Salvation Army Home. 8°, 138 pp., with 42 illustrations. St. Louis: C. V. Mosby Company, 1922.

Of the asperities encountered by *Homoneanderthalensis* along the pathway trod by him in his entrance into this world, prehistoric anthropology has told us little or nothing. But certain it is that *our* species of the human genus finds a certain disproportion between "the passage and the passenger," which at the best must be compensated for by certain temporary changes of form in the foetal cranium and by the most intense propulsive and expulsive muscular effort on the part of the uterus, while at the worst normal labor becomes entirely impossible and Caesarean section must be substituted therefor. But whether it be best or worst, it is always bad enough. And because childbirth differs so fundamentally in the agonizing disturbances produced by it from all other *normal* physiological processes, mankind has since the dawn of history, and before, been ever seeking methods that might minimize injuries to the child during parturition and might lighten the woes of the woman in travail. History of the medical art, even in the earliest times, records many obstetrical procedures known to the ancients. Caesarean section, forceps, and attempts at correction of malpresentation are not modern. But until the discovery of the anaesthetic properties of ether, obstetric effort was in the very essence of things directed toward assisting the normal forces of nature or replacing them by some substitute when they showed themselves ineffectual, and little or nothing was accomplished toward relieving pain. Chloroform and ether in the nineteenth century were found to be applicable to obstetric practice as methods of analgesia which would not, unless pushed to the stage of too deep a narcosis, interfere with efficient uterine contractions. Twilight sleep had its day. Pituitrin has been placed in its proper position in the obstetrician's armamentarium. But as yet man has not succeeded—if we except the Caesarean operation, which after all is not legitimately employed except in the face of certain definite indications—in revolutionizing the methods established by natural law for the transition between foetal and extrauterine life, or in ameliorating the suffering attendant thereon, in anything like the same degree that his present-day methods have changed the treatment and the outcome of—for example—acute inflammatory disease of the vermiform appendix.

The question has often arisen as to whether difficulties of parturition as they exist today are normal to the human race or are the result of characteristics acquired through the evolutionary development of our civilization. If we seek an analogy among the lower animals, we must conclude that nature exacts something in payment for the privilege of maternity in all species. Veterinary obstetrics as a specialty has developed upon the basis of parturient difficulties among the domesticated animals, while naturalists report instances of similar accidents in wild animals.

Medical literature of all lands in recent months has given a large place to "version" or, as it is perhaps more frequently referred to in Europe and South America, "Potter's version." The articles that deal with this subject are not all of one tone. Many unqualifiedly approve; many scathingly and sarcastically condemn with such expressive questions as "Has rational obstetric practice disappeared forever?" Version is version, and it has been version for many centuries past, and to this fact Dr. Potter gives due importance in his extended chapter on "The early history of version." Herein he refers to all the important contributions in medical writings with reference to the management of labor in cases of malpresentation that are contained in the literature from the Hippocratic obstetrics to the end of the 18th century. The historical side of this subject is further amplified in the second chapter, wherein the practice of podalic version is shown to have entirely replaced the cephalic form of the procedure. The author next gives a synopsis of present-day opinions of eminent obstetricians on the general subject of version, its indications and technique. The author in the fourth chapter gives a detailed description of his own method of performing version, which is so clear and concise that a really comprehensive abstract could do little else than copy that particular section. It is stated that this description is word for word that which was embodied in a paper read by Dr. Potter before the Philadelphia Obstetrical Society in 1920. One chapter is devoted to answering criticisms and objections which have been advanced against version as it is advocated and employed by the author. The sixth chapter deals with "The indications and advantages of version," and the book is concluded by a statistical chapter in which several hundred deliveries by version are analyzed. The following table shows the various complications met with by the author in a series of 1,113 cases, of which 920 were delivered by version.

"There were in the total number of cases: 80 abdominal Caesarean sections; 13 footlings; 22 breech cases; 2 vaginal Caesarean sections; 39 instrumental deliveries; 2 cases were delivered by instruments on the after-coming head, following version. There were 9 cases of twins.

Twelve of these 1,113 cases delivered themselves before I got to them. There were 10 cases that were delivered as ordinary vertex cases. There were 3 face cases—2 with the chin anterior and 1 with chin posterior. It was necessary to do a craniotomy in one case for hydrocephalus.

There were 41 stillborn children, classified as follows:

Breech, 2.

Short cord, 2.

Hydrocephalus, 3 (1 of which required craniotomy).

Prolonged labor, faulty presentation (persistent L.O.P., no fetal heart sound heard, seen in consultation, child dead before delivery), 1.

Exposed prolapsed cord, no pulsations felt in cord, 5.

Hydrocephalus with spina bifida, 1.

Face presentation and prolapsed cord, 1.

Twins, premature, 4 month, 1;

Disproportion between child and pelvis, 3 cases (each child weighed 10 pounds).

This I feel was an error of judgment on my part. I should have done a Caesarean section in each case.

Eclampsia, 1. Patient had a number of convulsions during 24 hours before delivery and was very toxic.

Macerated fetus, specific, 1.

Macerated fetus, where no evidences of syphilis were found, 6.

Monsters, anencephalic type, 5.

Cord around legs and arm, 1.

Persistent albuminuria of mother, 1.

Persistent L. O. P. seen in consultation, 1.

Placenta previa, 7 mos., 1.

Fibroid tumor complicating labor, child showing effects of severe loss of blood, 1.

Brow case, 1.

Marginal placenta previa at term, severe hemorrhage, 1.

Diabetes in mother, 1.

Faulty position of head at term, seen in consultation. Forceps had been applied.

Child dead, 1.

"Of the complications those having to do with the cord were most numerous, and seem to bear out my statement made previously that cord complications are the cause of the majority of our still-born children.

There were 16 prolapsed cords.

10 short cords.

Complete knots were found in three cases.

Twisted cord was found in 2 cases.

The cord was around the neck; once in 37 cases; twice in 13 cases; three times in 3 cases; four times in 1 case; six times in 1 case with a living child; once around neck and between the legs four times; twice around neck and between the legs two times, cord between the legs necessitating cutting before delivery, 5 times;

Cord around both legs once.

There was one case of loose placenta and one of adherent placenta.

Marginal placenta previa, 7 cases.

Central placenta previa, 2 cases.

The largest baby was 12½ pounds. One also weighed 12 pounds 1 ounce.

"There were thirty-four children who died in hospital before being discharged or inside of 14 days from birth classified as follows:

1 congenital syphilis, aged 8 days.

12 convulsions, from 36 to 72 hours.

1 congenital malformation of heart (blue baby).

1 hemorrhage into and rupture of suprarenal gland—found by autopsy 4 days after birth.

1 cause of death unknown.

10 were bleeders, living from 2 to 6 days.

5 inanition, living from 1 to 3 days (all were premature from 5 to 7 months).

3 monsters, living from 2 to 3 days.

"Two mothers died who had been delivered by version. One, a poorly nourished patient, sick with colitis and running a temperature for a week before delivery, living 41 days, dying from the effects of her colitis which she had had for years. Blood cultures, three weeks following delivery, were sterile. The second case was up and around the hospital ready to leave when she developed lobar pneumonia, involving lower lobe of right lung, spreading to the left lung, dying from a double pneumonia four weeks following delivery. She was an old influenza case."

The textual description of the author's technique of "version" is most profusely illustrated with photographs and schematic diagrams. These are so numerous, so detailed, both in themselves and in the legends that accompany them, that it may be said that no individual step in the whole process is not illustratively represented.

Whether or not obstetric art has finally discovered that for which it has so long sought, namely, the method which will largely do away with the agony and the physical wear and tear of the second stage of labor, still remains to be seen. Whether or not version, as practised by Dr. Potter, is a "one-man method," to be routinely employed with safety and precision only by those who, like its foremost present-day exponent, are exceptionally well qualified from all points of view, can be answered only by a consideration of the extended experiences of many workers in this field. It may be allowed us to hope, but it is still too early to predict with assurance. At any rate one gathers the impression from reading the book here under review that in version as in all other surgical problems success of the highest degree must and will always depend upon a meticulous attention to all the details of the operation. The difference between crudity and refinement of method will determine the success or failure of this procedure in the hands of each individual obstetrician.

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AN INDEX OF TREATMENT BY VARIOUS WRITERS: Edited by Robert Hutchison, M.D. F.R.C.P., Physician to the London Hospital; and Physician to the Hospital for Sick Children, Great Ormond Street; and James Sherren, C.B.E., F.R.C.S., Surgeon to the London Hospital; Consulting Surgeon to the Poplar Hospital for Accidents. Revised to conform with American Usage by Warren Coleman, M.D. Assistant Professor of Medicine, University and Bellevue Hospital Medical College; Visiting Physician to Bellevue Hospital, New York. 8th Edition, 8°, 1,029 pp., with 88 illustrations. New York: William Wood and Company, 1921.

There was a time in the history of American medicine when it seemed fashionable to disregard in certain measure—or at least to minimize the importance of—the treatment of disease. By this is meant such treatment as is employed by the internist, for operative therapy in this country has never lacked zealous and devoted disciples. In the years referred to one often heard it said that “diagnosis is all there is to medicine,” in exactly these words or words of similar import. Thus it came about that many of the products of our medical schools went out from the halls of professional learning with their heads full of long diagnostic tables arranged in parallel series, by means of which cerebral hemorrhage could be differentiated from acute alcoholism and diabetic coma (and other analogous diagnostic miracles might be performed), but with all too little notion of what they might, could, or should therapeutically do for their patients when once they had checked up the various entries in their parallel columns. More latterly a change has come about in our system of medical education in respect to treatment. It is rational to believe that this change has resulted in very large measure, at least, from certain factors which are here arranged in the order of what is believed to be their relative importance:

- (a) Specific therapy by sera, vaccines, transfusions, etc.
- (b) Chemotherapy (more or less specific) starting with the exhibition of quinine in malaria, and being tremendously stimulated by the introduction of salvarsan.
- (c) Endocrine therapy.
- (d) Physiotherapy including massage, electrotherapy, phototherapy, heliotherapy, Roentgentherapy, radiumtherapy, diathermy, hydrotherapy, and other physiotherapeutic measures too long left by the profession in the hands of quackery.
- (e) Psychotherapy, a factor in treatment which no internist can afford to ignore.
- (f) Regulatory treatment, including dietetics, rest, and analogous measures.

This awakening of interest is reflected in the increased number of manuals, handbooks and textbooks on treatment which have appeared since the beginning of the therapeutic renaissance. In the United States this good work has been strongly supported by the American Medical Association, which, zealously alive to the desirability of giving to the profession the best of practical assistance in the most useful form, has produced many publications having a therapeutic slant, of which the very valuable “Handbook of Therapy” is perhaps the most notable. Larger works on therapeutics are finding an ever widening circle of readers, and among these the “Index of Treatment by Various Writers,” which appears in its eighth American edition in 1921, is one of the most extensive and important. This work is arranged on an encyclopedic or dictionary basis, with the names of diseases, the names of organs and regions of the body, and the names of certain therapeutic systems (for example, “electrotherapeutics” and “specific therapy”) used as a basis of classification. This will be easily seen by a glance at the following list of the more important headings extracted from the complete “Supplementary Index”:

Abdominal injuries, Abortion, Abscess, Acidosis, Actinomycosis, Addison's disease, Adenoids, Alcoholism, Anaemia, Anaesthetics, Aneurism, Angina pectoris, Apoplexy, Appendicitis, Asthma, Atherosclerosis, Bier's hyperaemic treatment, Boils, Bone, Brain, Breast, Bronchitis, Calculus, Cancer, Cataract, Chancroid, Cholera, Chorea, Cleft palate, Congenital dislocation of hip, Conjunctiva, Constipation, Cornea, Cystitis, Diabetes,

Diarrhoea, Diphtheria, Dislocations, Drug habit, Dysentery, Ear, Eclampsia, Electrotherapeutics, Enteric fever, Epilepsy, Eye, Eyelids, Fevers, acute infectious; Foreign bodies, Fractures, Gastric ulcer, Glaucoma, Goitre, Gonorrhoea, Gout, Gunshot wounds, Hemorrhage, uterine; Hare lip, Hay fever, Headache, Health resorts, Heart, Hemiplegia, Hernia, Hydrophobia, Hypnotism, Hysteria, Infant feeding, Iritis, Jaw, Joints, Kidney, Lachrymal apparatus, Larynx, Leprosy, Leukemia, Liver, Lumbago, Malaria, Massage, Measles, Meningitis, Mental diseases, Mouth and pharynx, Myocardial failure, Nephritis, Nerves, Neurasthenia, Nose, Oesophagus, Paraplegia, Phlebitis, Pneumonia, Poisoning, Poliomyelitis and encephalitis, Prescribing, Pruritis, Psoriasis, Psychoneurosis, Puerperal sepsis, Pulmonary tuberculosis, Rabies, Radiotherapy, Radiumtherapy, Rheumatism, Rheumatoid arthritis, Rhinitis, Rickets, Salivary glands, Scarlet fever, Shock, surgical; Small pox, Snake bite, Specific therapy, Spine, Sprains, Stammering, Sterility, Stomach, Stumps, Syphilis, Tabes dorsalis, Talipes, Teeth, Tendons, Tetanus, Thermotherapy, Tics, Tongue, Tonsillitis, Transfusion, Tuberculosis (referred in each case to the organ or part involved), Urethra, Urine, Uterus, Vomiting, Whooping cough, Wounds, Yellow fever.

Throughout, the book contains numerous prescriptions for use in the non-specific diseases. The dietetic treatment of diabetes is extensively handled. Surgical therapy does not include in general specific details of operative procedure, but contents itself with an analysis of the indications for operation, the general character of the various operations mentioned, and the post-operative care somewhat more in extenso. The book fails to make mention of the recent work on the exhibition of quinidine in auricular fibrillation, it being apparently the case that this article was rewritten for the eighth edition before quinidine came much into notice. Otherwise the treatment of diseases of the heart appears to have been brought down almost to the present minute. A very clear exposition of the use of baths and packs, their indications and details of administration, are given under "Hydrotherapy." Hypnotism and suggestive therapy are conservatively treated. The treatment of mental diseases occupies a section of several pages and deals with this important matter from every angle. Diseases of the myocardium are grouped under the general heading "Myocardial failure." The bismuth treatment of syphilis seems to have come on the stage too late to secure admission to the catalogue of anti-syphilitic measures. The article on yellow fever did not fail to catch up *Leptospira icteroides* and Noguchi's antiserum.

All in all the present edition of this work is considerably amplified, particularly in the matter of specific therapy and physiotherapeutic measures, over the 7th edition. It continues to be, as always, a valuable source of reference for those who seek information regarding the best and, in general, the latest devices in the matter of treatment of disease.

A. N. TASKER,

*Major, Medical Corps, U. S. Army.*









*J. L. Pleadwell, Captain, M.C.,  
U. S. Navy*

President, The Association of Military Surgeons of the United States, 1921-22

# THE MILITARY SURGEON

VOL. LI

DECEMBER, 1922

NUMBER 6

## FRANK LESTER PLEADWELL

CAPTAIN FRANK LESTER PLEADWELL, Medical Corps, U. S. Navy, was born in Taunton, Mass., August 9, 1872; attended the public schools of that city; matriculated in the Harvard University Medical School, September 29, 1892, and graduated from that institution, June 24, 1896, with the degree of Doctor of Medicine, *cum laude*.

Upon conclusion of a successful examination for admission to the Medical Corps of the Navy, he was appointed an assistant surgeon from the state of Massachusetts, October 24, 1896. His naval career, therefore, has extended over a period of twenty-five years, eleven of which have been spent on sea service. During the Spanish-American War he saw active service in the West Indies as medical officer of the U. S. S. *Nashville* (bronze medal in recognition of services in the engagement at Cienfuegos, May 11, 1898), and during the World War he was on duty abroad as a member of a joint Army and Navy Mission studying the medical aspects of the war. In addition he was assigned as assistant naval attaché at London, and as medical aid to Vice-Admiral W. S. Sims, Commander, U. S. Naval Forces in European Waters. He served also for the latter period of the war as medical aid to the Commandant of the Fifth Naval District. In 1920-21 he held the position of Fleet Surgeon and Aid on the Staff of the Commander-in-Chief of the Atlantic Fleet. At present Captain Pleadwell is serving as assistant to the Bureau of Medicine and Surgery. Captain Pleadwell's record of service shows that he has been on duty at the following stations and ships: Naval Laboratory and Department of Instruction, Brooklyn, N. Y. (1896-97); U. S. T. S. *Constellation* (1897); U. S. S. *Texas* (1897); U. S. S. *Nashville* (1897-99); Bureau of Medicine and Surgery (1899-1900); U. S. S. Flagships *Kearsarge* and *Olympia* (1900-1903); Naval Dispensary, Washington, D. C. (1903-1905); Naval Hospital, Yokohama, Japan (1905-1907); Bureau of Medicine and Surgery (additional duty at Naval Medical School), 1907-1909, (Assistant to the Bureau, 1909-10); President, Naval Examining and Naval Medical Examining Boards (1910); Naval War College (1910); U. S. S. *North Dakota* and U. S. S. *Delaware* (1910-1913); Naval Medical

School and Naval Dispensary (1913-1916); Duty abroad in Connection with Problems of Organization, British Medical Services; Assistant Naval Attaché, London, England, and Medical Aid to Vice-Admiral Sims (1916-1917); Medical Officer, Navy Yard, Norfolk, Va., and Medical Aid to Commandant, Fifth Naval District (1917-1919); Naval War College (1919-1920); Fleet Surgeon and Aid on Staff of the Commander-in-Chief, Atlantic Fleet, U. S. S. *Pennsylvania*, Flagship (1920-1921); Bureau of Medicine and Surgery, Division of Education and Publications (1921); Assistant to Bureau (1921-22).

Under the head of special duties, Captain Pleadwell has been named as delegate to the following congresses: Delegate on the part of the United States to the Second International Conference for Revision of Nomenclature of Diseases and Causes of Death, Paris, France, July 1-3, 1909; delegate to represent the United States Navy at the Twelfth International Congress on Alcoholism, London, July 18-24, 1909; delegate to represent the Medical Corps of the United States Navy at the Annual Meeting of the American Public Health Association, Richmond, Va., October 19-22, 1909; delegate from the Public Health Association and representative of the Medical Department of the Navy at the Meeting of the XVth International Congress on Hygiene and Demography, Washington, September 23-28, 1912; designated to represent the Navy Department at the 24th Annual Meeting of the Association of Military Surgeons, Washington, September 13, 1915.

Captain Pleadwell is a Fellow of the American College of Surgeons and the American Medical Association, holds a Naval War College Diploma, is a member of the American Public Health Association, and an Associate Member of the Medical Society of the District of Columbia.

For service in the Spanish-American War he received a bronze medal, conferred in accordance with the provision of an Act of Congress approved March 3, 1901, in recognition of services on board the U. S. S. *Nashville* in the engagement at Cienfuegos, Cuba, May 11, 1898; the Spanish Campaign Badge in recognition of the same service, and was recommended for award of a Navy Cross, by Admiral W. S. Sims, U. S. N., "in consideration of meritorious service rendered the United States during the Great War" (Report of Sub-Committee on Naval Affairs, U. S. Senate, on Sen. Res. 285, 66th Congress, 2nd Session, pp. 200, 481). The Order of Commander of the Order of the British Empire was conferred upon Captain Pleadwell by the British Government in recognition of services in Great Britain during the World War and he has received a Certificate of Commendation from the Navy Department for meritorious Service on the Staff of the Commander-in-Chief, U. S. Naval Forces in European Waters.

Captain Pleadwell has been a member of the Association of Military Surgeons since 1900 and is the author of the following articles and papers:

1. "Median Cervical Fistula" (Thyro-glossal fistula), Case History and Operation. *Nav. Med. Bull.*, Vol. 1, No. 2, July, 1907.
2. "Report on the Second International Conference for Revision of Nomenclature of Diseases and Causes of Death," held in Paris, France, July 1-3, 1909. *Nav. Med. Bull.*, Oct., 1909.
3. "Report on the Twelfth International Congress on Alcoholism." London, July 18-24, 1909. *THE MILITARY SURGEON*, Vol. 25, p. 318.
4. "The Tenth Hague Convention and Its Relation to the Evacuation of Wounded in Naval Warfare." Read before the Summer Conference, Naval War College, Newport, R. I., Sept. 13, 1910. Published in the *Nav. Med. Bull.*, Oct., 1911, and Jan., 1912.
5. "The Scope of Hygiene in the Administration of the Fleet." Read before the Summer Conference, Naval War College, Newport, R. I., Sept. 14, 1910.
6. "Some Minor Sanitary Defects in Modern Battleships and their Correction." Read at Conference of Medical Officers of the U. S. Atlantic Fleet, Guantanamo Bay, Cuba, 1912. Published in the *Nav. Med. Bull.*, July, 1912.
7. "Hygiene of the Engine-room Force with Special Reference to the Mitigation of the Effects of Heat and Humidity in the Engine-room Under Certain Assumed Battle Conditions." Read at the XVth International Congress on Hygiene and Demography, Washington, D. C., Sept. 23-28, 1912, and published in the Proceedings of the Congress.
8. "A New Theory of Ventilation and Its Application in Certain Situations Aboard Ship." Read at Conference of Medical Officers, U. S. Atlantic Fleet, Guantanamo Bay, Cuba, Feb. 11, 1913, and published in *Nav. Med. Bull.*, April, 1913.
9. "The Relationship of the Hospital Ship and Medical Transport to the Fleet in Time of War." Read at the Annual Meeting of the Association of Military Surgeons of the United States, Denver, Colo., Sept. 18, 1913, and published in *THE MILITARY SURGEON*, Oct., 1913.
10. "Sanitation in Camps and Hospitals on the British Front in France." Read at the Annual Meeting of the Association of Military Surgeons of the United States, Camp Greenleaf, Fort Oglethorpe, Ga., Oct. 14-16, 1918, and published in *THE MILITARY SURGEON*, Jan. and Feb., 1918.
11. "An Early Reference in Medical Literature to the Relation Between Focal Infection and Arthritis." *Jr. Am. Med. Assoc.*, Vol. 72, No. 11, p. 817. Mar. 15, 1919.
12. "Naval Ambulance Trains Observed in Great Britain." *Nav. Med. Bull.*, Oct., 1919.
13. "British Ambulance Trains." Read at the Annual Meeting of the Association of Military Surgeons of the United States, St. Louis, Mo., Oct. 13-15, 1919, and published in *THE MILITARY SURGEON*, Jan., 1920.
14. "William Paul Crillon Barton (1786-1856), Surgeon, United States Navy. A Pioneer in American Naval Medicine." (Biographical study prepared for "Contributions to Medical and Biological Research Dedicated to Sir William Osler, Bart., M. D., F. R. S.," presented on the occasion of his seventieth birthday.) Published in the *Annals of Medical History*, Vol. II, No. 3, p. 267, and in *THE MILITARY SURGEON*, March, 1920.
15. "Types of Motor Ambulances Observed Abroad." Read at the Meeting of the Association of Military Surgeons of the United States, New Orleans, La., April 22-26, 1920.
16. "Observations in Italy." Read at the Annual Meeting of the Association of

Military Surgeons of the United States, Boston, Mass., June 2-4, 1921. (*THE MILITARY SURGEON*, Aug., 1921.)

17. "James Inderwick, Surgeon, United States Navy, 1813-1815." *Nav. Med. Bull.*, No. 4, Vol. 16.

18. "Jonathan Cowdery, Surgeon in the United States Navy, 1767-1852" (Conjointly with Lieut. Commander W. M. Kerr, Medical Corps, U. S. Navy). *Nav. Med. Bull.*, No. 1-2, Vol. 17.

19. "Usher Parsons (1788-1868), Surgeon, United States Navy." *Nav. Med. Bull.*, Vol. 17, No. 3, and *THE MILITARY SURGEON*, Vol. li, No. 4.

*Translations*

1. "Le Croiseur L'Alger en Extreme-Orient." (The Cruiser *Alger* in the Far East.) Oudard. *Arch. Med. Nav.*, Sept., 1909. *Nav. Med. Bull.*, Jan., 1910, p. 103.

2. "La Ventilation pendant Le Combat." (Ventilation during Battle.) Bastier. *Arch. Med. Nav.*, Dec., 1908. *Nav. Med. Bull.*, April, 1910, p. 255.

3. "Rapport d'Inspection Generale de L'Escadre du Nord." (Report of a General Inspection of the Northern Squadron.) Mercié. *Arch. Med. Nav.*, Jan., 1910. *Nav. Med. Bull.*, July, 1910, pp. 429-438.

4. Review. "Hygiene in the French Navy." *Lancet*, Mar. 12, 1910. *Nav. Med. Bull.*, Oct., 1910, pp. 566, 567.

5. A Translation of an Account of the Sinking of the Japanese Battleship *Hatsuse*. *Nav. Med. Bull.*, July, 1912.



## PRESIDENT'S ADDRESS<sup>1</sup>

### THE ASSOCIATION IN RETROSPECT WITH SUGGESTIONS FOR THE FUTURE

IT IS with a deep sense of appreciation of the honor conferred upon me that I arise to address you in accordance with the long-established custom of our society. The distinction of having been chosen to preside over an organization of nearly 3,000 members representing the largest medico-military society of which I have knowledge enhances the honor but does not lighten the responsibility I feel at this moment.

The Association of Military Surgeons, with its history of thirty years of achievement, has a great heritage which it is the duty of every member to sustain. In order that this aspect of heritage, and tradition may exert its full appeal to you, I wish to present in brief review the earlier history of the Association, and relate something of its progress in the education of the military surgeon. I may then conclude with a few constructive suggestions for future development.

I desire to point out that the term military surgeon as used in this address is intended to cover all classes of military officers comprised within the membership of the Association, namely, those of the Army, the Navy, the Public Health Service and the Organized Militia and National Guard.

Thirty-one years ago this last month, a group of some fifty surgeons of the National Guard, representing fifteen states of the Union, assembled one evening in the parlors of the Leland Hotel in Chicago and organized the body now known as the Association of Military Surgeons of the United States. Nicholas Senn, a surgeon of character and ability was the animating spirit in this group of individuals. His mind had conceived the project, his activities brought it to fruition, and his energies assured its success. To Nicholas Senn, therefore, we accord full credit as the founder of this society and assign him the most distinguished place in our traditional history.

I should be tempted to indulge in a more extended reference to our founder and to his career if this had not already been done in a charming biographical sketch read by Dr. Horace Manchester Brown at the New Orleans meeting in 1920.

Colonel Senn had always shown an active interest in the medical affairs of the National Guard. His experience while Surgeon General of the National Guard organizations in two States had brought him to realize the great need for improving the character and efficiency of

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<sup>1</sup>30th Annual Meeting, Washington, D. C.; October 12-14, 1922.

the medical staffs, and in the spring of 1891, the idea of organizing a national association of the surgeons of the National Guard assumed concrete form. The meeting in September followed. Thus was constituted the first annual meeting of this Association. There have been twenty-nine similar meetings, one each year, excepting the year 1898, a year of war, and in 1916, owing to mobilization of forces on the Mexican Border, the meeting for that year was postponed to 1917.

The annual meetings have been held in many cities of the country, usually in the Eastern sections, for convenience of access by the majority of members, but one meeting has been placed in Kansas City, and one in Denver. Five meetings have been held in Washington, three in St. Louis, and two in each of the cities: Chicago, Buffalo and Boston. The cities of Philadelphia, Columbus, New York, St. Paul, Detroit, Norfolk, Atlanta, Richmond, Milwaukee, Baltimore, Cincinnati, Indianapolis, Camp Greenleaf (Georgia), and New Orleans, divide the remaining honors of having entertained the Association in the past.

For the last three meetings the plan has been followed of having our meeting just precede that of the American Medical Association. This was done in the hope that a larger attendance upon our sessions might result. At the New Orleans meeting in 1920 the plan worked in a satisfactory manner, but in Boston last year the results were not so good, and for the present meeting it was decided to return to Washington.

The first meeting in Chicago on the evening of September 17, 1891, was preceded by a function referred to in contemporaneous records as a "sumptuous repast." Dr. Senn officiated as host. It is apparent that he fully appreciated the value of this important preliminary to the successful launching of a cherished scheme.

The object of the association as defined in the proceedings of this meeting, was to found a society "for the advancement of military and accidental surgery, and all things pertaining to the health and welfare of the civilian soldier." The qualification "civilian soldier" in this definition lends emphasis to a fact which I think few of us realize today, namely, that the Association at its inception was purely a National Guard movement, and the title of the Association first adopted plainly indicated this, namely, "The Association of Military Surgeons of the *National Guard*."

After Incorporation by Act of Congress approved January 30, 1903, the definition of the object of the Association was amplified somewhat, and Article II of the Constitution now reads:

The object of the Association shall be to increase the efficiency of the medical service of the Army, the Navy, the Public Health Service,



of the Organized Militia of the different States by mutual association and the consideration of matters pertaining to the medico-military service of the United States both in peace and in war.

Only two years passed after the first meeting before the membership was broadened to include medical officers of the federal services. The present liberal classes of membership have come as a result of experience and represent a gradual evolution.

The records of the first annual meeting state that the deliberations were characterized throughout by harmony and fraternal good fellowship, and all the delegates returned to their respective states much impressed with the value of this their first step toward self-education and mutual support in developing the efficiency of the military surgeon. It is scarcely necessary to note that Colonel Senn was elected the first President, which office he worthily held for three consecutive years.

It will be of interest to members here present to know that we have a representative of the pioneer group of founders with us today, and I think that we are particularly fortunate in having the name of this charter member on our program, the youngest "old man" of us all, Dr. Horace Manchester Brown of Milwaukee. The Association has drawn heavily upon Dr. Brown's versatile powers in the past, and his eloquence has held us enthralled upon many occasions. Let no one fail to be present this year when he steps to the rostrum with his contribution!

Lieut. Col. Albert H. Briggs, of New York, was our president in 1906. As he joined the Association in 1892, he is only one year removed from being a charter member, and in spite of his four score years and over he has written to say that he will make the effort to be with us on this occasion. I hope that we shall have an opportunity to extend a hearty welcome to Colonel Briggs.

I regret to announce that Brig. Gen. J. D. Griffith, of Missouri, one of the old guard, and an honored ex-president, has been obliged, through illness, to abandon his plan of attending this meeting.

Of the sixty-three original members enrolling in the year 1891, but thirteen remained in 1920. The others have passed to the great beyond. From 63 in 1891, the membership rose to about 800 in 1915, and to 6,847, the maximum, in 1918. The tremendous increment in 1917-1918 reflected war conditions, and it was inevitable that there should be a falling-off of numbers with the resumption of peace. But a substantial increase in members still remained when peace was declared. This increase was not to be attributed solely to the war influence, for in 1916, Colonel Munson of the Army, then secretary, organized the movement for a revival of interest in our welfare, and due largely to his

efforts the affairs of the Association took on a tremendous impetus. The present membership numbers about 2,900.

At the second annual meeting at St. Louis in 1892, the mission of the Association reached a much clearer definition in the presidential address delivered by Colonel Senn. With respect to some of the subjects treated in this address he showed an almost prophetic foresight.

One project recommended by him as worthy of future accomplishment was the establishment of medical schools for the practical training of medical officers of the Army and Navy. It was not long before both the Army and the Navy had such schools. In addition he stressed the importance of state associations of military surgeons, pointing out that while the national association should be the center of our actions, and its meetings the forum for exchange of views and discussion of pertinent questions, the extent of territory from which our membership is drawn is so great that we can hardly expect more than a portion of the total membership to attend the Annual Meetings. Hence the desirability of the formation of state chapters. It is true that the absent members gain much professionally by reading the journal, but to become infused with the necessary stimulus for work and to get the best results in an educational way, it is essential that there shall be personal contact between members in general meetings where expression may be given to varying views upon the problems under consideration.

I regret to state that Colonel Senn's suggestion regarding the state associations lay dormant for many years. At the New Orleans meeting in 1920, a committee was formed to study the question of organizing state associations to be formed as branches of the national body. Under the energetic impulse of the chairman of the committee, Major G. M. Blech of Chicago, an Illinois chapter was successfully formed. The movement, however, has not been widespread and excepting the one in Illinois, and possibly another in Texas, I am unaware of any further progress in this direction.

The federal services soon manifested an active interest in the Association, and at the 1892 meeting a number of professional papers were presented by medical officers of the Federal Government. In the proceedings one reads the names of Greenleaf, Girard, Hoff, Alden and LaGarde of the Army, Gihon of the Navy, Wyman of the Marine Hospital Service, and Weaver and others of the National Guard. Honorary membership was extended to many distinguished surgeons in foreign countries and to the Surgeon Generals of the Army, Navy and Marine Hospital Service. In addition, President Senn asked that every member of the medical corps of the Army and Navy be allowed the full privileges of the convention.

The third annual meeting was originally planned to take place in Washington, but the opening of the World's Columbian Exposition in Chicago led the Executive Committee to select the latter city as a place of meeting for 1893.

Several important matters of future policy were to signalize this meeting. A Prize Essay Committee was appointed and a sum of money allotted to provide a bronze medal to be awarded to the author of a successful essay.

In subsequent years the Association received two endowments which had as their object the procurement of papers of professional merit, the writers to receive prizes.

In 1899 Colonel Senn announced that Major Enno Sander of St. Louis, a charter member of the Association, would donate annually the sum of \$100 for a gold medal to be awarded to the writer of the best essay offered on a medico-military subject. In 1916, Mr. Henry S. Wellcome, of London, offered to contribute each year a gold medal and \$300 as first prize and a silver medal and \$200 as second prize, to be awarded annually by the Association for the best and second best "researches, discoveries, inventions, designs, improvements, essays, or any other acts or deeds which the Executive Council of the Association may consider desirable and helpful to the objects of the Association, and relating to any phase of medico-military affairs and disease control associated with the Army, Navy, Militia and Public Health and Marine Hospital Service in times of peace and war, at home and abroad. These two awards to be made according to merit, and the competition to be open to any member of, or person eligible for membership in, the Association of Military Surgeons of the United States.

The record of the third meeting shows that correspondence was had with Surgeon General Sternberg of the Army and Surgeon General Tryon of the Navy, regarding the admission of officers of the Medical Corps of the Army and Navy to active membership. Both Surgeon Generals were in hearty accord with the idea, and a resolution was adopted to change the name of the Association to meet the new conditions of membership. A distinctive seal and badge were provided.

The first official delegates from the federal services appeared at this meeting, namely, Col. Bernard J. D. Irwin, Major Valery Havard and Capt. Charles B. Ewing of the Army, and Surgeon D. N. Bertolette of the Navy.

Another important matter entered upon at the third annual meeting was the appointment of a committee to consider the feasibility of publishing a journal. The committee reported that a military medical journal was entirely feasible and essential and that the interests

of the United Services would be materially subserved by such a publication.

The committee, no doubt, were materially influenced in reaching this favorable decision from a knowledge that a widespread demand had been made for the first two issues of the annual proceedings. The edition of volume one had become exhausted long before the date of the third meeting, and until quite recently even the archives of the Association had no copy of this first issue. Thanks to Dr. Horace M. Brown, who generously presented the Association with a copy, our series is now complete. I hold this small volume before you. It comprises only thirty-five pages and presents a striking contrast when compared with its bulky successor, such as this volume for 1917. This exhibit indicates roughly our progress in the course of a quarter century.

The healthy growth of the Association in membership since the previous meeting was revealed in the increase of active members to 149, and the honorary to 51.

Professional papers of a high order of merit were presented at the third meeting. Colonel Senn read a classical thesis on *Enterorrhaphy*.

It was apparent from the character of the work presented in the literary programs of the meetings thus far held that the association had already justified its existence as a factor of high professional and educational value to the military surgeon.

The fourth annual meeting in 1894 was held in this city. It was opened with an address by President Cleveland. The heroine of the Red Cross, Miss Clara Barton, was presented to the convention and invited to a seat on the platform. An increase of 37 active and 4 honorary members during the year was reported. The literary program at this meeting maintained the same high level of excellence established in previous years and is representative of those which followed from year to year. Another excellent paper by Dr. Senn on "Abdominal Surgery on the Battlefield," was presented and a symposium on "Transportation of Wounded in War" brought forth a valuable discussion. The names of LaGarde, Girard, Smart, Keefer, Havard, Woodruff, Reed, Bache, Glennan, Perley, Irwin, Pilcher, Forwood, Bushnell and others of the Army appear in the program or proceedings, as do those of Bertollette, Ames, Tryon, Anderson, Boyd, Wise, Beyer, Cleborne, Marmion, and Bradley of the Navy, and Hamilton, Murray, Peckham, Young, and Wertenbaker of the Marine Hospital Service. The National Guard was represented by many distinguished surgeons. The fifth annual meeting was opened in Buffalo in 1895. Dr. Senn contributed a scholarly paper entitled "Conservative Surgery on the Battlefield, and First Aid to the Wounded." The names of LaGarde, Park,

Fowler, Griffith, Terry, Greenleaf, Tryon, Russell, Stitt, Smart, Bache, Borden, Brown, Girard, Wise, Forwood, and Hoff stand out prominently in the program and proceedings. It is invidious to single out any particular paper for mention, as they were all of a high order of merit, and may still be regarded as noteworthy. I read the titles of some of these papers as they indicate very fairly the character of the literary programs appearing in this and in subsequent years.

"Some Considerations Concerning the Location and Detection of Missiles," by Roswell Park; "Septic Bullets and Septic Powders," by Capt. Louis A. LaGarde; "Experiments with the New United States Army Rifle," by Lieut. Col. Charles R. Greenleaf; "The Relation of Naval Architecture to Proper Sanitation," by Surgeon General J. R. Tryon; "Aid to the Wounded on Shipboard," by Passed Assistant Surgeon Averley C. H. Russell, U. S. Navy, and "The Handling of Wounded on Shipboard During Action," by Passed Assistant Surgeon E. R. Stitt, U. S. Navy.

And so I might continue to review the proceedings from year to year, but the time allotted forbids, and I refrain from exhausting your patience. I feel that I have presented enough of our early history to show a continued and sustained interest on the part of a relatively small group of men, animated by patriotic motives and having constantly before them the praiseworthy object of keeping alight the flame of unselfish endeavor in this enterprise which was started by Senn and his associates in 1891. But as one scans the records of the past years it is apparent that there were times when interest waned, when the bank balance as a consequence, dwindled, and even financial disaster threatened, but there were always a few who held steadfast, manned the pumps and kept the ship afloat until smoother water was reached.

After the war in 1898 a noticeable reawakening of the Association occurred and the proceedings show a remarkable series of papers on military and hygienic subjects which still have high professional value.

In 1910 an important change in the constitution was approved which required that the president and the three vice-presidents of the Association be elected from and represent in regular rotation, the Army, the Navy, the Public Health and Marine Hospital Service, and the Organized Militia. As a consequence of this requirement there have been nine presidents from the National Guard and Organized Militia, seven from the Army, six from the Navy and five from the Public Health Service. This provision of the constitution has operated most beneficially. It has aroused a greater interest in the Association on the part of the members representing the different elements comprising the membership, and has tended to bind them into a more coherent whole.

A more marked revival in Association matters followed the Great War, and this Association, like others, experienced both the good and the ill effects of the peculiar post-bellum group integration which manifested itself by the formation of numerous societies, often short-lived and frequently doomed to disintegration after a limited time. Thus far we have weathered the storm and some of the good effects of this post-bellum influence have predominated. But even during the least prosperous times of the Association, it was undeniable that beneficial results had flowed from its establishment, both in successfully bringing about an improved organization of the medical departments of the National Guard, Volunteer Militia and State Troops, and in giving to military surgeons of the Federal Services in its meetings and in its journal a common medium for the study, consideration of, and exchange of views, regarding the problems peculiar to our profession. Its valuable influence in this direction has received ample acknowledgment from many sources and especially from the Surgeon Generals of the Army, the Navy and the Public Health Service.

I have thus reviewed a portion of our history to give point to my original contention that a distinguished past is solid foundation for a prosperous future, but also to point out that the sum total of prosperity, depends upon the summation of individual efforts. Success requires that each member be imbued with sufficient interest and pride in the Association to contribute his share to the common weal. As one of my distinguished predecessors has cogently observed, no association, however well organized and conducted, can continue prosperous and achieve its mission, without the earnest support of its members. A lukewarm and perfunctory participation in its affairs is not enough. Each member must realize his responsibility and resolve to play his part in the game.

It would appear conclusive that the possession of a going concern with ample good will as a part of its capital, a well-edited journal, a substantial sinking fund and a membership comprising 2,900 surgeons of diversified talents and abilities should give ample assurance of a brilliant future. I believe that the association has this future, but the membership cannot afford to accept this view with entire complacency, and make no exertion in the direction of a practical interest, or assume that efforts on their part are unnecessary.

There are certain elemental duties the full performance of which every member owes to the association. Firstly, and the most essential, he should pay his annual dues promptly. Secondly, he should contribute of his experience by writing for the Journal. Thirdly, he should proselyte for new members. Fourthly, he should attend the annual

meetings and contribute something to the program and discussions. If I should express which of these duties I consider has priority in point of urgency, after the payment of dues, I should place first the acquirement of new members. We have not yet entirely stemmed the drift away from the association which followed the armistice. It is vital to the integrity of the structure of this body that the places of those who have left us be filled by new members and that promptly. So let the slogan be "*Every member get a member.*" During the year, June, 1921, to July, 1922, 272 new members were elected, but during the same period there were 164 resignations and 275 were dropped for non-payment of dues, making a net loss in membership of 164. The Secretary has organized and is carrying out a campaign to recover, if possible, some of the losses just mentioned. When one considers the thousands of medical men, ex-officers of the recent war, who are eligible to membership, and whose interest in medico-military affairs should have become activated during the war, a fertile field in which to proselyte for new members is offered. How best to get them interested to join would make an excellent subject for the next prize essay competition, and help a bewildered treasurer.

Military medicine knows no boundaries, and under the provisions of international law as military surgeons we are obligated to extend our assistance to friend and foe alike. This being so, there is implied a familiarity with the methods of other nations and the cultivation of friendly relations which shall pave the way to full cooperation in the humane mission which it is the object of this association to foster and promote.

In his address before the association in 1892, Colonel Senn spoke of the desirability of organizing an International Congress of Military Surgeons. He thought that this might be effected through the medium of the Association of Military Surgeons of the United States. I quote from his address:

It is difficult to realize what great things could be accomplished for the benefit of humanity and the advancement of military surgery by an association of military surgeons representing all nations. Should you think favorably of this suggestion, I would recommend the appointment of a committee representing as many nationalities as are at our disposal, with power to invite the different nations to send delegates to our next meeting. The delegates can be made members by invitation, and towards the close of the session the Congress could be organized.

The committee appointed to study this subject did not make a report until 1907. They stated:

that, owing to the complications introduced by reason of the official relations of the medical officers of foreign governments, the establish-

ment of the proposed International Congress of Military Surgeons seemed at present impracticable, and recommended that the Committee be discharged and that any further efforts along this line be devoted to the development of the military and naval sections of the International Medical Congresses. On motion the report was accepted, adopted, and the Committee discharged.

Although this idea of Colonel Senn's did not reach a full development, yet it suggested the thought that our relations might be extended beyond the national boundaries of the country by inviting Foreign Governments, with whom we were in diplomatic relations, to send delegates to our annual meetings. This procedure has now been followed for many years, and foreign visitors have often held a conspicuous place in our proceedings.

As an additional measure to further encourage cordial relations between our association and the military surgeons of other countries, many surgeons of position and renown have been elected to honorary membership. The list of such members is too long to repeat in detail here, but a summary will indicate what has been accomplished in this direction. I will name the countries and state the number of individuals to whom honorary membership has thus been extended in each:

Great Britain (including India).....	41	Austro-Hungary.....	2
Canada.....	23	Guatemala.....	2
France.....	20	Sweden.....	2
China.....	12	Holland.....	2
Italy.....	10	Switzerland.....	1
Japan.....	9	Honduras.....	1
Germany.....	7	Peru.....	2
Mexico.....	6	Nicaragua.....	1
Cuba.....	5	Portugal.....	1
Belgium.....	4	Denmark.....	1
Norway.....	3	Servia.....	1
Spain.....	2	Argentine.....	1
Russia.....	2	Siam.....	1
		Total.....	166

In accordance with this time-honored custom, we have with us today delegates from the countries of Great Britain, France, Japan, Spain, the Argentine Republic, Peru, India and Canada. I know that all members of the association will join with me in extending to Surgeon Rear Admiral C. M. Beadnell, of the Royal British Navy, but also representing the Army, Colonel Rouvillois, Médecin Principal de 1<sup>o</sup> Classe, Professor of Military Surgery at the School of Application of the French Army Medical Corps, and Lieutenant Colonel Picqué, Médecin Principal de 2<sup>o</sup> Classe, of the Military Hospital of Bordeaux, and Professor of Anatomy at the Faculty of Medicine at Bordeaux, Colonel P. G.



Goldsmith, C. B. E., Canadian Army Medical Corps, Lieutenant Commander Joaquin Sanchez Gomez, of the Royal Navy of Spain, and Attaché of the Spanish Embassy, Major Endoro Aquilar of the Medical Corps of the Peruvian Army, Major Bunshiro Tanabe, Medical Corps of the Imperial Japanese Army, and Major Neocles Ragusin of the Medical Department of the Army of the Argentine Republic, a very hearty welcome to our councils. This is not the first time that the countries which these gentlemen so worthily represent have honored us by assigning delegates to our meetings.

In looking over the proceedings for thirty years past, I have noted the following names of officers who have come to us from Canada: Strange, Ryerson, Borden, McWatters, Bergin, Neilson, Jones, LeBel, Tiset, Fotheringham, Parke, Delaney, Maclaren, Rennie, Shillington, Williams, McGarry, Clark, Warner, Primrose, Bazin, Connell, and Peters.

The first representative of the British Navy to attend our deliberations was Inspector General R. W. Coppinger, in 1904. In 1905, Fleet Surgeon J. Lloyd Thomas; in 1906, Staff Surgeon Arthur Gaskell; in 1909, Sir James Porter, Medical Director General of the Navy; in 1911, Surgeon General Arthur W. May; in 1913, Surgeon General Wm. H. Norman, and in 1920 Surgeon Rear Admiral Sir Humphry Davy Rolleston. The British Army has been represented in the past by the names of Macpherson (1906), Leishman (1907), Russel (1908), Keogh (1909), Goodwin and Gilmour (1917), Morgan, (1918), Pilcher (1920-21), and Waring (1920).

The Indian Medical Service sent us Lieut. Col. H. T. Brown in 1905, Major W. H. W. Elliot in 1906 and 1908, and Major Arthur Henry Moorhead in 1907.

On consulting the records I find that Surgeon David Matto, of the Peruvian Army, attended the thirteenth annual meeting at St. Louis in 1904, and, in 1921, Lieut. Col. Leonicio I. de Mora.

The first delegate from Japan came to our meeting in 1899, Lieutenant Commander Tomatsuri of the Imperial Japanese Navy. In 1905, Baron Saneyoshi, Medical Director General, and Surgeon General Baron Takaki were made honorary members. We had as a delegate in 1905 Surgeon General S. Suzuki, now Medical Director General of the Japanese Navy. In 1909 Dr. Tomatsuri again attended our meeting and in 1921 Surgeon Commander Yasuzaeman Hori of the Navy appeared and read a paper.

France has sent the following delegates: In 1901, Professor H. Nimier; in 1904 and 1905, Col. H. Mareschal; in 1909 and 1910, Major Ruotte; in 1911 and 1912, General Favier; in 1912, Major Barthélemy

and Major Ruotte; in 1917, Col. Charles Dercle; in 1920, Prof. Leon Monier, Roussy, Demarest and Gregoire, and in 1921, General Bergasse.

In 1910, two officers were delegates from the Argentine Republic, Capt. Antonio Agudo Avila, of the Army, and Surgeon Jose Garrochategui, of the Navy.

Lieutenant Commander Sanchez Gomez, of the Spanish Navy, was gathered into the fold of this society at the Boston meeting in 1921 and was gracious enough to read us a paper there. He is not the first representative from Spain, for I find that in 1904 Captain Don Juan Redondo y Godino of the Navy and Don Eduardo Cisneros Sevillano of the Army attended the St. Louis meeting, Captain Redondo reading a paper on "First Aid to the Wounded in Naval Battles."

I repeat our hearty welcome to the delegates from abroad and express the hope that they will derive both enjoyment and profit from their stay with us, and from their attendance upon our deliberations.

My valedictory approaches its end. To my associates on the executive council and to the secretary-treasurer-editor and his able assistant, Mr. Womeldorph, I proffer my heartfelt thanks for their never-failing interest and willing assistance.

To the members of the Association and to our guests, who have so generously contributed to the literary program, and to those who have helped in the arrangements for the meeting, I extend on behalf of the Association a cordial appreciation. To my own brethren of the Navy who came forward with papers far in excess of my expectations, I extend my sincere thanks. As a final word to the membership, I quote from one of the early addresses of the founder: "Make the cause of this Association your own and . . . the Association of Military Surgeons of the United States will be one of the largest, most influential and useful associations in this country, honored and respected at home and abroad."

I close with this quotation from Browning:

The common problem, yours, mine, everyone's,  
Is—*not* to fancy what were fair in life,  
Provided it *could* be—but, finding first  
What *may* be, *then* find out how to make it fair  
Up to our means—



# THE RELATIONS OF THE UNITED STATES MILITARY AND PUBLIC HEALTH SERVICE TO CIVIL PRACTICE<sup>1</sup>

By A. W. BOSWELL, M.D.

*President, District of Columbia Medical Society*

I AM not unmindful of the great honor of presenting a paper to you on this occasion, and I beg to assure you that it gives me much pleasure to address this great organization, composed of men who are deeply interested in the perpetuation of the high ideals of the great profession to which we belong. The Association of Military Surgeons of the United States is a great and powerful institution. It has developed from small beginnings in this country to a wide-flung line of superior medical intelligence interested in the unhampered development of military surgery and medicine, and necessarily in the perpetuation of the highest ideals which had their beginning in the little Island of Cos under the direction of Hippocrates.

Those of us who make even the slightest attempt to keep posted upon the ever-changing phases of social evolution as it pertains to medicine cannot but be impressed by the fact that a great revolutionary tendency in medical affairs is making itself more and more felt, until now it has become necessary for every physician in this country to prepare himself for the part in it which he must play.

The revolutionary tendency to which I refer is the ever-widening, nay, enormously increasing, scope of the activities of the Government in the affairs of medicine.

If the medical practitioners of this country are awakening to the exigencies of the situation, and in their local and general conclaves are showing a disposition to curb this tendency, it must not be hastily concluded that they are doing so from an entirely selfish standpoint.

I need not remind you of the spirit of self-abnegation, the sacrifice and the service to humanity which have characterized the medical profession during the past, nor dilate upon the contributions it has made to human health and happiness. You are entirely familiar with these things. My desire is solely to bring before you certain unassailable facts and briefly discuss with you their bearing upon the future of medical practice on the one hand, and the integrity of our free institutions upon the other.

The problem which confronts us, reduced to its final analysis, is this: Shall the old plan of the individual initiative be perpetuated or

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the United States, Washington, D. C., October 12-14, 1922

shall the medical profession renounce its time-honored principles, abandon its altruistic attitude, and submit to a bureaucratic and socialistic regime in which the individual shall become a puppet or pawn in the play of governmental machinery?

We may well ask ourselves at the outset: Why is it that society should show a disposition to demand any material change in the old regime?

The answer to the question is so complex that no categorical answer may be given, but it cannot be denied that the medical profession as a whole is perfectly willing to make such adjustments in its policies as will inure to the best interest of society and social progress.

In other words, the medical society is not a union advocating and insisting upon the closed-shop principle. It has been and still remains an aggregation of educated and high-principled individuals whose chief concern, outside of self-preservation, is the advancement of the state and the perpetuation of social progress.

There is, however, one thing to which they never can and never will agree, and that is the lowering of the standards set up by centuries of stress and progress which may be said to constitute the very foundation upon which the science and art of medicine is founded.

We shall not stress this feature of our argument since there can be no difference of opinion upon this point by the members of the Association of Military Surgeons. No doubt we are all agreed that the qualification to practice medicine should conform to the highest developments of human knowledge and should, of course, according to the principles upon which our Government is founded, be equally incumbent upon all.

The essence of Americanism is *initiative* and springs from individualism. State medicine would be the death knell of these two ingrained instincts, and it must never be allowed to enslave the medical profession of free America, either under that name or any other insidious industrial or insurance propaganda.

It might be of interest to show a few instances of state medicine as related more specifically to the individual. Can you realize the influence of the Workmen's Compensation Act, the scope of treatment rendered by the Veterans' Bureau and Public Health Services? If an individual is suddenly taken sick while employed in government service, he has the privilege of surgical consultation, hospital treatment, and the awarding of compensation for his disability, irrespective of its etiological factors.

I ask you, why should the individual, because he happens to be taken sick between the hours of 9 a. m. and 4.30 p. m., be entitled to such treatment at the hands of the Government, when there is no

direct connection between services rendered and injuries received? Another example will, I hope, impress and stimulate you to the serious consideration of this phase, namely, the gradually increasing tendency of the government agencies to handle and treat all types of disease. Venereal disease certainly cannot be due to any duties required by the federal authorities, yet government dispensaries are daily treating these cases. It is inevitable that the extension of bureaucratic medicine by the Government will destroy the energies and incentive of the physician by its present tendency to diagnose and treat all manner of diseases, irrespective of their relation to the Government.

Perhaps you may not be cognizant of the fact that the Government is at the present time actually establishing and equipping dispensaries at the larger post offices in which it is intended to treat sick individuals of the federal service.

The Workmen's Compensation Act, the Shepherd-Towner Maternity Act, bills relating to compulsory health insurance, etc., all bear the stamp of paternalism and socialism. These fads, fancies, doctrines, or whatever you may term them, are for the most part imported socialistic schemes, often products of political expediency, and are encroachments upon the fundamental policies of our country.

State medicine or compulsory health insurance has been tried out in several foreign countries, notably, Austria, Germany, and England, and they have not proven a boon to either the state or the profession. Under compulsory health insurance in Germany, the physician averaged  $6\frac{1}{4}$  cents per office consultation,  $12\frac{1}{2}$  cents a regular visit, and 36 cents a visit to maternity cases. By working from early morning to late at night he managed to earn from \$3,000 to \$4,000 per year, so you may readily understand the great demand upon his services. A day's work meant about thirty office patients from 8 to 10 a. m., and twenty to thirty more in the evening, ten to fifteen visits in the morning, ten or more in the afternoon, and fifteen to twenty in the evening. His work was, of course, mechanical and had no scientific value. The work of this physician resulted in the undermining of his health, and in six years he was dead.

The medical profession in the countries mentioned, where state medicine is in vogue, are fighting the system tooth and nail. They see nothing to it but the degradation of the profession and the reduction of science to mechanical labor.

The relation of state medicine to civil practice was, as you probably know, seriously debated by the House of Delegates of the American Medical Association at its seventy-third annual session in St. Louis in May of this year. The Reference Committee on Legislation and

Public Relations had referred to it, for consideration and report, five resolutions of individual societies which had been introduced on the floor of the House of Delegates pertaining to state medicine. These resolutions were introduced by Dr. Wm. Gerry Morgan of the District of Columbia, Dr. R. L. Green of Illinois, Dr. C. D. Selby of Ohio, Dr. Randolph Winslow of Maryland, and Dr. James F. Rooney of New York. The committees recommended to be proposed a modification of the Rooney resolution which, they thought, represented the best solution of the problem. The resolution is as follows:

The American Medical Association hereby declares its opposition to all forms of "state medicine" because of the ultimate harm that would come thereby to the public weal through such form of medical practice.

"State medicine" is hereby defined for the purpose of this resolution to be any form of medical treatment, provided, conducted, controlled or subsidized by the federal or any state government or municipality, excepting such service as is provided by the Army, Navy or Public Health Service, and that which is necessary for the control of communicable diseases, the treatment of mental disease, the treatment of the indigent sick, and such other services as may be approved by and administered under the direction of or by a local county medical society, and are not disapproved by the state medical society of which it is a component part.

The above report was duly considered and adopted, and the resolution passed. While there is no doubt that this resolution intends, upon a fair interpretation of its terms, to place the official stamp of disapproval by the House of Delegates of the American Medical Association, representing over 80,000 individual practitioners, upon all forms of state medicine on the high ground that ultimate harm to the public interests is bound to come by their adoption, a more careful analysis of the resolution, however, shows that its wording emasculates its principle and weakens its usefulness. I refer to the excepting of such service as is provided by the Army, Navy, or Public Health Service. Now it is through these three great and useful governmental agencies or their cognate branches, by a false interpretation of their proper functions, that some of the most glaring inroads of "state medicine" have been, are, and will be made, in my humble judgment.

A much better resolution than the one above referred to was that introduced by Dr. Wm. Gerry Morgan of this city (Washington, D. C.), who represented the Medical Society of the District of Columbia in the House of Delegates. He had been directed by this society, of which I have the honor to be president, to present to the House of Delegates of the American Medical Association, for its consideration,

a preamble and resolution passed by our local organization at a regular meeting held on April 5, 1922, as follows:

Whereas, There is need of a well-defined and authoritative expression of the opinion of the organized medical profession upon the proper participation of government in the health problems of citizens; and,

Whereas, The resolutions thus far adopted by the American Medical Association have not, in our opinion, afforded the laymen interested in this subject a clear conception of the preponderant judgment of physicians upon it;

*Resolved*, That the Medical Society of the District of Columbia is opposed to assumption by the state, in any of its units, of the obligation to provide for the medical care and treatment of its citizens either directly or by health insurance schemes or otherwise, except as incidental to the maintenance of its proper wards by reason of indigency, insanity, or delinquency; for the reason that this society believes that the obligation to provide medical care and treatment is the duty of the individual citizen and not of the state, and for the further reason that assumption of that obligation by the state would be harmful to the people and fatal to the progress of medical science; and be it further

*Resolved*, By the Medical Society of the District of Columbia, that it is the duty of government to safeguard and promote the health of citizens by the exercise of its police power through the recognized activities of health departments and the Public Health Service; by the enactment of legislation for the general purposes of the pure food and drugs act; by setting standards, and compelling conformity thereto, for fitness to practice medicine, dentistry and pharmacy; by setting standards of excellence for hospitals, sanatoriums and medical educational institutions; by promoting the study and prevention of social and industrial diseases; and by disseminating information to all citizens to enable them to protect the health of themselves and their families.

It seems to me that this resolution sums up, in an almost perfect and certainly an unequivocal manner, the stand upon the proper medical relations which should exist, and which, indeed, at one time did exist, between the Government on the one hand and its servants on the other.



## A BRIEF SUMMARY OF THE "CONGRÈS INTERNATIONAL DE MÉDECINE ET DE PHARMACIE MILITAIRES"<sup>1</sup>

BY COMMANDER WILLIAM SEAMAN BAINBRIDGE

*Medical Corps, U. S. N. R. F.*

THE FIRST International Congress of Military Medicine and Pharmacy took place in Brussels, Belgium, in July, 1921. It was organized by the Belgian Medical Service, on the basis of a plan conceived by Belgium in the summer of 1920 to hold a convention of the official representatives of the medical corps of the Allied, Associated and Neutral Powers. This plan culminated in the first meeting of an International Congress pertaining to military medical lessons learned in the World War. Its sessions, which were held in the spacious halls of the Palais Mondial of the Parc du Cinquantenaire, have already become an outstanding achievement of contemporaneous military medicine and surgery. The outcome was so gratifying in every respect that it was decided to hold similar assemblies every two or three years, until the entire fields of medicine, surgery and sanitation, in relation to the war, are covered. Tangible results were accomplished, and the conclusions adopted by the congress were unanimously accepted by all the nations represented.

From every viewpoint the congress proved a great success. It was held under the patronage of the King of the Belgians, who was present at the opening meeting and personally received each of the delegates. The date of this first congress, twenty months after the cessation of hostilities, was well chosen. Its main object was to profit by the teachings of the war both during the conflict and in the first few years of the reconstruction period immediately following. Another object was the compilation of instructive material from every side, with a general discussion of special experiences, this composite material to be subsequently standardized and codified for future reference. Distinct lessons in medicine, surgery and sanitation are products of all wars, and Belgium realized that in this last and greatest of all "international clinics" there must be new points, and old, forgotten facts revived, which called for timely compilation and absorption into the store of general professional knowledge. Promptness of execution was important, for, aside from casualties of actual warfare, there is always the incessant industrial strife, with the incident accidents of

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922. This paper was illustrated by an official film of three reels taken by the Belgian Government.



peace time. International contributions, as well as a consensus of opinion, were naturally most readily obtainable while the nations were still welded together through a recent community of interests.

The entire procedure constitutes at the same time a new and most promising way of writing medical history. Much delay has previously occurred in the publication of medical histories of wars, and the results were often inadequate, one-sided, statistical reports, without a real attempt at comparison and standardization of experiences. Eighteen years were required for writing the medical and surgical history of the Civil War, which fills six large volumes, three medical and three surgical. Some of the lessons taught by the World War have already, through the congress, been made accessible for the furtherance of contemporaneous medicine and surgery.

Representatives of the medical services of all allied and neutral powers were invited to attend the congress officially, and a considerable number of unofficial representatives were permitted to take part in the discussions, as it was the desire of those who conceived the plan to open every avenue of information and enlightenment. The decision to invite the neutral nations to participate was an excellent one, for many of their physicians and surgeons had worked, during the war, in both a civil and military capacity, with the Central Powers. Thus, through them, the congress was able to obtain full information from the enemy's side, which otherwise could not have been acquired. The conclusions which were finally adopted therefore virtually constitute the product of a world collaboration. The forward movement imparted to the military medical service by the meeting of this congress culminated in a promise of a permanent cooperation between the many nations which met in Brussels in the persons of their representatives.

The various governments have issued or are to issue official reports, and abstracts or summaries of those already published have appeared in a number of medical periodicals, domestic and foreign. The full *American report* will appear in the *December issue* of the *Naval Medical Bulletin*. In this complete official American report the conclusions appear exactly as worded by the congress, only the language (English for French) differing from the original form, but in the following these have been somewhat "anglosaxonized."

A duplicate set of the interesting reels which were prepared by the official photographers, working under the auspices of the Belgian Government, was presented to the American delegate, who takes pleasure in exhibiting them before this association.

With respect to the *general organization of the Medical Army Service, and the relations of the Military Medical Service with the Red Cross*, the

congress held that all measures concerning the adaptation of medical service to military media, in peace as well as in war, be passed only after close collaboration between the command and the Medical Service; and that the members of the Medical Service be ranked in accord with the military officers, so that, when military conditions permit, medical subjects be dealt with by those most capable to handle them. In every large unit, the representatives of the Medical Service under the authority of the command must be invested with the power to elaborate and enforce orders concerning the operation of the Medical Service in all its modalities. Medical technical consultants, selected for their special qualifications, should be attached in war time to the members of the Medical Service under the military command. The entire personnel of the national medical profession is invited to compete for special service, in recognition of efficiency, in time of war. The material utilized by the Medical Service for the transportation, evacuation and treatment of the wounded, and for the equipment of the sanitary formations and technical organizations attached thereto, must be planned in conformity with industrial and scientific progress, and its adequacy at the outbreak of hostilities must be guaranteed. In the investigation of the chemical problems which arise in all armies, the special competence gained by military pharmacists must receive due consideration.

*Lessons of the war in the treatment of fractures of the limbs* formed one of the most important contributions of the congress to contemporaneous surgery. Among the guiding rules of fracture treatment, as derived from experience taught in the war, special stress was laid by the congress on the following points: (1) The imperative necessity of regular and repeated use of radiography in the course of treatment or at the bedside. (2) The necessity of modifying esquillectomy, in compound fractures, according to the needs of drainage and surgical disinfection. (3) The primary importance of planning surgical treatment from the first day with respect to the functional future of the limb, and of utilizing all physiotherapeutic measures for this purpose, particularly the earliest possible mobilization. (4) The indications for the old classic immobilization treatment of fractures in plaster apparatus have practically ceased to exist, and pre-war appliances must be replaced by modern apparatus as proven efficient in the armies, notably walking apparatus and continuous extension apparatus, simple or combined with suspension. (5) It is necessary in war time to reduce all transportation apparatus to a few simple, strong models with interchangeable parts, easy of application, and permitting continuous extension of the fractured limbs. (6) Specialized services should be organized in peace time, in the large industrial and urban centers, in

analogy with war services, and provided with a competent staff as well as necessary equipment.

*The fight against tuberculosis in the army*, as held by the congress, must be based, in order to be efficient, on the enforcement of universally recognized preventative measures of community and personal hygiene. The anti-tuberculosis education of the soldier and his environment is advantageously supported by means of instructive pamphlets and similar means. It is recommended to keep a personal sanitary record and a medical memorandum for each man, stating his antecedents and his general health during the time of his active service, preferably including also the period of service in the reserve. Repeated routine examinations of all the men are indispensable, especially during their incorporation in the army. All men infected with tuberculosis must be refused admission into the army. For prophylactic reasons, the temporary or definite removal is required of all those who present the manifestations of tuberculosis. Continued investigations are desirable in order to ascertain the practical value of the various numerical indices and biometric standards which have been proposed for determining the degree of body vigor, especially as related to tuberculosis. With regard to national prophylaxis, the congress held that it is advisable to establish a permanent association of the civilian anti-tuberculosis administrations and the military authorities. Soldiers discharged on account of tuberculosis are to be referred without delay by the Army to the civilian administrations.

With respect to the *anti-venereal campaign*, the congress having taken cognizance of the extent and gravity of the venereal peril in the armies, held that military as well as individual and social interests demand most rigorous anti-venereal procedures. Venereal diseases, being infectious, should be fought primarily in the civilian population in order to reach all foci of infection and help to prevent contamination of the army. The following rules should govern the organization or fortification of the anti-venereal fight in all its modalities in the armies: (1) Educative measures, as extensive, timely, and instructive as possible. (2) Protective measures, aiming at the preservation of health. (3) Therapeutic measures, after infection has occurred. (4) Subsequent supervision of the patients. (5) At the time of their discharge, venereal patients who are still in need of medication should be referred to civilian services where they can make further application for treatment.

Concerning the use of *poison gases in warfare*, the following resolutions and recommendations were formulated: It is of the utmost importance to organize the treatment of gassed soldiers in the course of warfare in freely movable special sanitary formations, established in

the immediate vicinity of the front. Acute cases are to be treated by specialists in gas poisoning. A very conspicuous sign must appear in the sanitary register of each gassed soldier, to be inscribed only after the diagnosis has been confirmed in a special gas hospital. Confirmed pulmonary tuberculosis is only very exceptionally observed as a direct sequel of gas poisoning. Permanent disturbances to be taken into consideration by experts for filing the invalidity percentage of old cases of gassing are practically limited to: (1) Tachycardia and irritable heart; (2) chronic respiratory disturbances; (3) more or less extensive loss of teeth; (4) neurasthenia and neurosis; (5) ocular disturbances, which are rare and easily recognized. In the establishment of the invalidity percentage, allowance must be made for the strain of chronic respiratory disturbances, as well as the diminished resistance of the lung against subsequent acute pulmonary infections. Lesions of this kind are restricted to cases of acute and severe gas poisoning which have required prolonged treatment in the hospital.

*The purification of the water supply in the field*, in the allied armies, was generally insured by means of chlorine, and its very extensive employment in this capacity showed it to possess certain important advantages. The determination of the amount of chlorine to be employed, although approximately solved for practical purposes, is still in need of confirmation. A variety of contrivances was put into practice in the war, most of which may be utilized in future according to the circumstances present. When the water supply is turbid, special apparatus must be provided to clarify the water before further treatment. The possible utilization of other agents besides chemical products was foreseen by the congress, in the recommendation of investigations concerning sterilization procedures by physical means, especially those based on the employment of ultraviolet rays or ozone.

#### NOMINATION OF A PERMANENT COMMITTEE

Having gathered the offerings of many helpful gifts for the future and concentrated those lessons of the war which were discussed at the congress in the form of conclusions, the congress expressed itself as well aware of the responsibility involved in the fact that the pick of the youth of many nations are entrusted at a certain important period of their life, about the age of twenty years, to the Military Medical Service. The latter therefore is naturally charged with a preponderating part in the health of the race. From the eugenic viewpoint, it is not too much to say that this part affects the world. This world rôle suffers at present under a scattering of efforts. The vital force which lives in military medicine must be centralized, for military medicine

alone, being officially organized in many countries, is in a position to propose, enforce, and satisfactorily control the requisite health measures. It was suggested that repeated conferences of this type would permit the realization of this goal, insuring to the entire human race the benefit of advance accomplished by one or other of the nations. Such a reunion would weld together the links tied by the first congress and be productive of beneficial results in several directions—for example, the important domain of industrial medicine. Finding it desirable not only to have other congresses, but to found an international association of military medicine and pharmacy under the same conditions, the congress elected a Permanent Committee, with the mission of centralizing all accomplished results, and charged with the arrangements for the next congress. This Permanent Committee, which held its first meeting at this conference, is composed as follows: President, Dr. Wibin, Belgium. Members: Commander W. S. Bainbridge, U. S. A.; Medecin Principal de 1 classe Uzac, France; Commandant A. v. Baum-berghen, Spain; Major A. D. Stirling, Britain; Lieutenant Colonel Caccia, Italy; Lieutenant Pharmacien Da Fonseca, Brazil; and Lieutenant Colonel Thomann, Switzerland. Secretary, Commandant Voncken, Belgium.

The second meeting of the Permanent Committee was held in Brussels in February, 1922, under the presidency of Inspector General Wibin and the secretaryship of Commandant Voncken. The following nations were represented: Italy, Britain, France, Belgium, Switzerland, Spain, and the United States of America. Subjects desired for consideration at the next congress were discussed, and selected and Rome was decided on as the next meeting place, first of the Permanent Committee, and then of the full II International Congress of Military Medicine and Pharmacy in May, 1923. Henceforth, two main papers on every subject are called for—one a contribution from the country in which the meeting is held, the other to come from the nation or nations in collaboration, to whom the subject is officially assigned. The suggestion was offered, leaving the discussion to the discretion of each country, to arrange a meeting of military surgeons in the years in which no international congress is held, for the collection of material for eventual use at the congress of the succeeding year.

This congress (with the establishment of this permanent international committee), in the judgment of all who were privileged to come in contact with the meetings in Belgium, marks the most advanced step towards real internationalization of military medicine, surgery and pharmacy. It is a welding of non-combatants whose beneficent influence may be a strong link in international comity.

# THE USE OF AUTOMATIC ABSORBABLE METALLIC SUTURES AND LIGATURES<sup>1</sup>

BY LIEUTENANT COMMANDER JOAQUIN SANCHEZ GOMEZ

*Medical Corps, Royal Spanish Navy, and Naval Medical Attaché to the Spanish Embassy, Washington, D. C.*

(With fifteen illustrations)

FOR some time when in Spain and for more than a year in the United States, I have been studying and experimenting with metallic sutures and ligatures. The present method of ligation and suturing could be, and should be, changed with resulting profit to the practice of surgery. We continue to ligate vessels and suture incisions in a primitive way and with primitive materials, using much more time, and the ligatures are, in the end, much less efficient than those which modern mechanics and metallurgy affords.

My system of ligation and suturing is based on the use of metals which may be more easily sterilized than catgut, silk or kangaroo tendon. These metals can be placed around blood vessels more snugly and are less in danger of slipping off or of becoming untied than the material in common use today. The metal appliances used are absorbable or not according to the nature of the case. In the absorbable variety the time of absorption varies from eight days to three years.

In some operations, as in goiter for example, the time of ligaturing may be lessened about 80 per cent, without excessive traction such as often occurs with the ligaturing in vogue and which often contributes to post-operative shock.

In surgery it is axiomatic that the results in operations in goiter and abdomen depend much upon the gentleness of the surgeon's manipulations. He is greatly assisted in his efforts by the use of automatic metal sutures and ligatures. Furthermore, the speed with these appliances lessens the time required to keep the patient under an anesthetic and consequently the amount of anesthetic used. Certainly these advantages justify the use of the method under consideration.

In applying these metal ligatures a forceps of a special make is required. It has the general form of the ordinary Kocher forceps and is manipulated in the same way (Fig. 1). The clips used are of a special make (Figs. 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15.) This forceps, as may be readily seen, is just the same on the outside as ordinary forceps, but on the inside of one blade there is a pocket for the metallic

<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the United States, Washington, D. C., October 12-14, 1922.

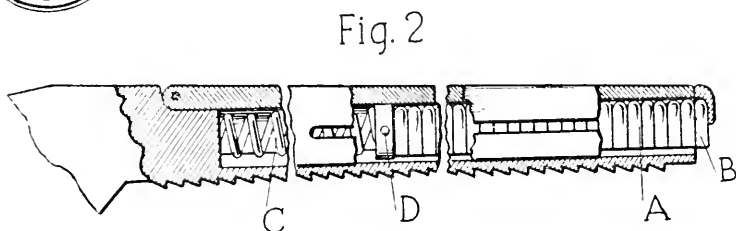
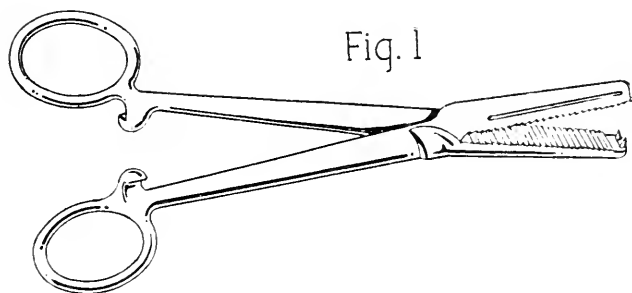


Fig. 5

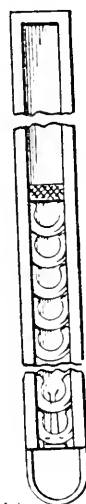


Fig. 6



Fig. 7



Fig. 14



Fig. 15



clips (Fig. 2), and a special device which pushes the clips out one by one, automatically, leaving them rolled around the blood vessels, with the assistance of the other blade of the forceps which, as you will note in Fig. 3, is peculiarly shaped at the end for this purpose.

This forceps is very easy to use, especially so in placing deep ligatures, which is sometimes quite difficult, particularly in obese patients. The metal clips used for vascular ligatures are made of zinc, cadmium and aluminum—soft metals which are easily adaptable to any form and are readily absorbed. They do not act as irritants to the tissue. Zinc is absorbed by the human organism in the form of organic salts, which, as is known, are far from being irritating; in fact, they are often used by the dermatologist in exudative inflammations where absorbents and protectives are indicated.

The time required for the absorption of the zinc varies from ten days to a month, according to the size and weight of the clips used, as I have been able to prove in my experiments on animals.

The form of the clips varies, but the most practicable and simple is that shown in Figs. 6 and 7 devised for vascular ligatures. As may be seen, it is an open ring, fitted on the inside with one or more very sharp points which serve to fix it to the vessel. When clamped in place by the forceps it stays tightly rolled around the artery or vein. For large vessels there should be a larger clip in the shape of a collar with ends which fit into each other, that is, the bifurcated point of one enters a mortise or hole with a shoulder or raised border. When the points strike the bottom of this cavity they double back and, filling the space, prevent the clips from opening.

As we have seen, the clips are carried in a compartment in one of the blades of the forceps (Fig. 2A). They are kept in place by the shape of the receptacle and by a spiral spring (Fig. 2C) which pushes them forward, presenting, always, one to slip through the opening *B* of Fig. 2, when it is pushed by the delivering mechanism represented in Figs. 3 and 4.

This mechanism of delivery is simply two points equal in height to that of the clip, and in width equaling half of the open space of the clip. These two points are located at the termination of a ring arranged in half-moon shape on the blade opposite to the one carrying the clips (Fig. 3A). When the forceps close, these two points press against the side of the clip which is in the other blade of the forceps, forcing it to close on the blood vessel or whatever is to be ligated, sutured or held in place, and allowing the clip automatically to leave the forceps by reason of the lessening in size that necessarily follows upon its being compressed (Fig. 4).

In order to load the forceps with clips, two methods may be employed.



One, the least desirable, is to place the clips in the exit, one by one, after having drawn back the spring by means of two small buttons which are attached for this purpose (Fig. 2D). The second and more effective way is to use a mechanical filler (Fig. 5), which holds the number of clips necessary to fill the clip reservoir. This is simply a strip of metal so formed as to hold the clip in position, which slips into the clip reservoir from which the metal clips are automatically released.

This method of applying ligatures is of great value in war surgery because of the speed with which hemorrhage can be controlled and the ease with which the suture material can be rendered sterile.

The clip for external suture is shown in Fig. 10. It is provided with two small dome-like covers which coincide with the points in the ends and serve to protect the punctures. The advantage of this arrangement of the clip is that it may be applied as a suture on top of a dressing, making bandages unnecessary.

The coaptation of the wounds is perfect, and the fixation of the dressing is better than by any other means; the line of incision and a zone, a centimeter wide, on each side of it are perfectly closed.

In order to remove the clip all that is necessary is to cut it in the center. The clip, being divided, can easily be taken out. The small cup or dome which each branch of the clip has to prevent the points penetrating too far, also prevents the clip sinking during the healing process. The points of this clip are of bronze or steel; the remainder is of soft aluminum.

A reliable firm of surgical instrument makers in New York is manufacturing this device, and they may be available for use within two or three months.



## THE MILITARY SURGEON AS A SPECIALIST<sup>1</sup>

BY CAPTAIN D. N. CARPENTER

*Medical Corps, United States Army*

IN THESE days of intensive specialization it is to be expected that medical officers of the Army and Navy should seek to obtain greater proficiency in chosen branches of their profession. How far this specialization should go is open to discussion.

The medical departments of the Army and Navy recognize the need of further instruction of graduates from civilian medical schools before they can satisfactorily perform their duties as military surgeons. The difference in requirements of duty is reflected in the curricula of the Army and Navy Medical Schools. Brig. Gen. Walter D. McCaw, Commandant of the Army Medical School, Washington, D. C., states in a letter of July 17, 1922:

Under our present scheme of instruction, all students, both medical and dental, first take a four-months course at Carlisle and afterwards come to the Army Medical School and the Army Dental School here in Washington. During the session just closed there were fifty medical officers and fourteen dental officers who had passed Carlisle undergoing instruction here in Washington.

As to specialization, we teach certain specialties, as you may see, in the school for two reasons. First, because in certain things, such as diseases of the eye, ear, nose and throat, roentgenology and in laboratory work, all medical officers are supposed to have a certain amount of training. Second, from the classes, we very readily pick out certain men who show unusual promise in some particular specialty and these men are usually selected to go to the general hospitals or the army laboratories to continue their work.

In the *Medico-Military Review* of May 15, 1921, the course at Carlisle is outlined as follows:

At the Medical Field Service School, Carlisle Barracks, Pa., instruction pertains essentially to the development of the military part of an officer's education, special emphasis being given to tactical (field) training.

At present the maximum accommodations provide for 90 student officers at one time. Facilities for expansion exist and in the future the capacity will be increased as funds for this purpose become available.

As this is a tactical school and the Medical Department consists of officers of the Medical, Dental, Veterinary, and Medical Administrative Corps, courses are arranged for the combined training of all these officers. On the contrary, it is contemplated that only medical

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.

officers will be given technical medical training at the Army Medical School, although, until other facilities are provided for them, the veterinary and dental officers will be considered eligible for laboratory and other courses to be conducted at that school. Eventually the Medical Department will maintain a technical school for each of its major services, such as an Army Dental School, an Army Veterinary School, and an Army Nurse School, in addition to the Army Medical School.

The long or standard basic course is primarily conducted to meet the needs of all candidates for admission to the Medical, Dental, and Veterinary Corps of the Regular Army. The instruction is progressive and extends from the school of the soldier to the organization, functions and administration of Medical Department units attached to the field forces or in home territory, in peace or in war, such as regimental detachments, medical regiments, evacuation hospitals, surgical hospitals, hospital trains, general hospitals, station hospitals, etc. The course is also designed to prepare the inexperienced officer for the discharge of his military duties upon entering the service, irrespective of whether his assignment be with mobile or fixed formations. The course constitutes his induction into military life and is a prerequisite to admission to the professional (technical) school of his special corps. When the needs of the Regular Army have been met, the remaining accommodations each year will be made available for M. D. officers of the National Guard or Reserve Corps who can spare the time to take this full course.

At the Army Medical School, Washington, D. C., instruction pertains essentially to the development of the professional part of an officer's education, special emphasis being paid to technical (medical) training.

At present the maximum accommodations provide for 75 student officers at one time.

The standard basic course in technical subjects is primarily conducted for medical officers of the Regular Army who have entered the service as commissioned officers since the beginning of the preceding course and who have satisfactorily completed the basic course at the Medical Field Service School at Carlisle Barracks, Pa., and for selected officers of the National Guard and Reserve Corps. It has as its object what might be termed as a post-graduate study of the following subjects in their application to military conditions: Bacteriology, Parasitology, and Preventive Medicine; Sanitary Chemistry, Nutritional Chemistry, Clinical and Operative Surgery, Clinical Medicine, Ophthalmology, and Roentgenology. (All clinical work is given at Walter Reed General Hospital, Takoma Park, D. C.)

The special advanced (post-graduate) courses are maintained for selected medical officers who desire to undertake post-graduate work, or make an intensive study of any professional specialty, including any of those subjects mentioned above. Students for the advanced courses will be selected for their special fitness for the particular subject or subjects they are to pursue. As these courses will be highly specialized, and as they will require a student's full time, each officer will, as a rule, be detailed to take but one of them during a given session.

The Naval Medical School, Washington, D. C., runs two classes a year of four and a half months' duration each. Capt. C. S. Butler (M. C.), in command, states in a letter of July 19, 1922:

It has been found during the twenty years of the school's existence that this length of course serves the bureau's purpose best and holds the student's attention with a minimum of lag. We have a laboratory capacity of thirty students. It is not practicable, however, for the bureau to order this number to each course. We had 27 in the fall class (1921), and 14 in last spring's class.

As to the needs of recent graduates, the course, as shown in the roster, meets these needs fairly well. It is the Surgeon General's wish that the course be made as sensitive to anything that is new and of value as possible, and we try to discard any item of instruction which doesn't pay its way. The Surgeon General has also instituted the policy of giving the recent entrants the course here, and the older men who have seen service any post-graduate work at civilian institutions which their service performance or peculiar bent may merit. This is making for better satisfaction and, in my opinion, is a constructive way of educating service medical officers.

We are establishing a school for Dental Officers and Aviation Surgeons, and will have these in operation in conjunction with this School by January 1, 1923. The special courses are also given to Hospital Corpsmen and to Female Nurses at various places.

We are making plans to increase the instruction in gas warfare and cardio-vascular diseases (including electrocardiography) and to give the class instruction in physiotherapy. A medical officer is now taking special work in this last with a view to acting as the bureau's adviser and school instructor in it.

After graduation from the Government Medical School, the young doctor has become, to a certain extent, a specialist—a military surgeon. With considerable proficiency in his profession from experience as interne in a civilian hospital, the young officer's career is about to begin. Those of us who have spent years in the service realize the value of experience from varied duties. Not only must the military surgeon keep abreast of the times in medical subjects, but the advancement of methods of modern warfare and military organization demand constant attention. The naval medical officer must understand the details of ship sanitation and should be informed as to methods of field sanitation in case of service with landing parties or duty with the Marines. The development of the submarine, aeroplane, and gas warfare has presented new problems which naval medical officers must solve.

It will require several years of application and experience before the army surgeon can handle the problems presented in the evacuation of wounded over complicated terrain. Modern methods of warfare have obliged army medical officers to extend their knowledge of poison-

ous gases, aviation, and handling of field casualties. In both services the professional duties of medical officer of the day at hospitals and stations are much alike, tho the military duty may be different because of the organization. Knowledge of clerical work and the preparation of necessary forms are important. Only experience by varied duties will train a medical officer to handle many problems which arise.

As for the purely professional requirements, the rapid advances in all branches of medicine and surgery require constant study. Then there are special subjects which a military surgeon must keep in touch with, such as: Tropical diseases, sanitation and military surgery. The requirements of duty may demand a considerable knowledge of obstetrics and pediatrics, after years of inability to use such previous training. Or else the military surgeon may be at an isolated post or on a ship where no eye and ear specialist is available and he must rely on his own skill and knowledge. He may be situated where opportunity is given to study new diseases, and knowledge of laboratory methods will prove invaluable. Ability to operate is always a requirement of a military surgeon.

It would appear, then, from this brief outline, that to be an able and well-qualified military surgeon requires one's best efforts of study and considerable experience and training. Are we perhaps wrong in trying to make him a "Jack of all trades and master of none?" Are the advantages of concentration on any one subject, as is done by civilian specialists worth while to the military surgeon?

Brigadier General McCaw states:

We know it to be highly necessary to have a certain number of qualified specialists in the service, and so far we have succeeded in producing such in numbers sufficient for our needs.

Captain Butler, of the Naval Medical School, has to say:

As regards specialization, the Medical Corps *must* have officers whose opinions are sound in many different specialties: e. g., X-ray, cardio-vascular diseases or surgery, laboratory (chemical, serological, pathological), hygiene and sanitation. Broadly these specialties set themselves off into those of internal medicine, surgery and sanitation. Now, it isn't incompatible with the ability to do the general work of the naval medical officer if he specializes in internal medicine or if he is the best operating surgeon in the Navy, or if his conception of the problems of hygiene is the best obtainable. In fact, if he knows his special work thoroughly and practically, he must know a good deal of medicine, surgery and sanitation in general. It is in this sense that the Navy must have specialists, but as for having these committed to a specialty in the more restricted sense of the civilian practitioner, I do *not* think it is desirable.

What are the advantages and disadvantages of intensive specialization for the military surgeon? The value of having men highly skilled in a specialty is clearly seen in civilian life, and it would appear logical to assume the same would be true for the government service. When we remember, however, the demands of duty for the military surgeon, requiring courses in various specialties after entry into the service, it is apparent that civilian and military practices are not entirely comparable. Every civilian community of any size maintains its specialists, to whom cases can be referred. The medical officer is, however, frequently alone on a ship which may not be near a hospital ship or port where a specialist is available. Or he may be stationed at a small, isolated post or detachment. To insure a reasonable degree of skilled care at all times for the officers and men of the Army and Navy, it is necessary to have a large majority of the Medical Corps trained to meet any emergency.

During recent years there has been a tendency for higher specialization, especially among the younger men, before they have attained proficiency as military surgeons. Concentrating on their specialty, they do not feel it incumbent to keep up in the other professional and military branches. In fact, if called upon to do the general duties of a medical officer, they feel that they should be excused. Then again, the effect of having specialists is to encourage other members of the corps to believe that it is not incumbent upon them to keep up in these subjects, hence there is a danger of lowering the general efficiency. If the surgery at our military hospitals is always done by men who have specialized, the large majority of the corps will soon be "gun shy" when called upon to operate. Dr. Rixey, when Surgeon General, recognized this and demanded that all the young surgeons at naval hospitals operate. The laboratory expert or internist may find it difficult to keep up his interest in surgery, or the eye, ear, nose and throat specialist is kept so busy with his specialty that there is no time to give to internal medicine or laboratory work. Recently we have seen medical officers concentrating on the problems of aviation, gas warfare, public health and industrial warfare, and special sanitation of submarines. Others have found administrative duties, obstetrics, pediatrics, dermatology and field service with the Marines of special interest.

Shall we permit such specializing to continue? What is the best and most reasonable solution of the problem? How shall we meet the danger of losing young men, trained at the government expense as specialists, and then resigning to go into the more lucrative field of civil life? What is the effect on the general morale of the corps if the

specialist cannot be sent to do the routine duties of a medical officer when his turn for sea occurs? How can a selection board conscientiously choose specialists for promotion to the ranks which require executive and administrative ability acquired by long experience in the varied duties of the service?

Commander H. W. Smith, of the Bureau of Medicine and Surgery, has given this subject considerable study and permits me to quote from an article in the *Naval Bulletin* as follows:

Closely as the practice of medicine in the service may parallel that in civil communities, so-called military necessities often compel wide departures from the model. An instance in point is furnished by the limits set on specialism in the Navy. There it must always be an anomalous specialism in which the particular is not pursued to the exclusion of the general. Therefore, the bureau, desirous as it is of fostering the spirit of research and the precision of specialism, nevertheless will be governed in framing its educational program and in making assignments to duty by the principle that specialism with us cannot be followed exclusively. The acquisition of a specialist's information in one field is altogether admirable, but it must always be superposed on a working knowledge of *all* duties which a naval medical officer may be called upon to perform. *Specialization cannot be allowed to unfit a medical officer for general duty, nor to exempt him from it.*

Rarely, and then only under special circumstances, will officers just graduated from the Naval Medical School be launched forthwith on a career of specialism. Instead, those officers who have been in the service for a period of several years will, at the expiration of a cruise, be given instruction in the subject they have chosen, and subsequently will be ordered to duty where they may practice it as a specialty. Similarly, men who have served longer, and who have had opportunity to manifest aptitude, will be given instruction of a more advanced character; for example, a man who is known to be an able general surgeon may elect a course of study in the surgery of the brain. From among men who have been able to follow this progression will be drawn chiefs-of-service, professional executives and coordinators.

The bureau does not feel compelled to extend active aid to all officers equally, believing that it should grant unusual opportunities for development only to those who have expressly signified their intention to remain in the service and who have already been in the service sufficiently long to have demonstrated their initiative, ability and industry. Conversely, medical officers need not fear that the display of these qualities will fail of reward, for nowhere, as in a military service, are ability and accomplishment so sure of gaining recognition. In making its selection of officers for training and appropriate duty afterward, the bureau will have as guides its knowledge of officers and such information as may be obtained from records, reports of fitness and the (new) personnel sheet of the Inspection Report. Further, it will be of assistance if individuals desiring training will see that their applications are on file, and if those possessing special experience will make that fact known to the bureau.

The specialties referred to in the preceding paragraphs are those intimately connected with the practice of medicine. Besides these, there are other subjects that are undeniably of greater importance in the Naval Service, such as Aviation Medicine, Field Service with the Marines, Chemical Warfare, Public Health and Industrial Medicine, subjects that carry a strong appeal to those who by temperament, inclination, or lack of opportunity fail to follow the lines of professional development laid down. Some of these subjects, in the present state of medicine, are commonly regarded as collateral specialties, or of minor importance, and for this reason many officers exhibit hesitation in identifying themselves with them, alleging that they do not pertain directly to the career of a naval surgeon and that their pursuit may in the long run prove unprofitable. The bureau dissents strongly from this view, regarding the attitude taken as not founded on a just estimate of the relative values and as unfortunate in its effects on the mission of the Medical Corps.

Commander Rossiter, attached to the Bureau of Medicine and Surgery, whose duty as detail officer permits him to have an intimate knowledge of the value of specialists to the corps, in a letter dated July 27, 1922, states as follows:

I find no difficulty in placing these men where their services will be of value, and where their specialty will either be fully utilized or at least kept alive.

Some of these men we can place on hospital ships; some with the expeditionary forces; some on flagships where their services will be available either to the fleet, division or force; some can only be placed where they will be able to carry on their specialty on their own ship, but, even so, if their interest is sufficiently great, they can keep the spark alive.

Undoubtedly, it is of great value to the service to have men well developed along certain special lines, but I feel equally sure that it would be most detrimental to the efficiency of the corps should they give entire attention to these specialties, as we must have men who can go to sea as "Medical Officers, U. S. Navy," and to establish a group of shore-going or fancy-job men would be destructive of morale, as it would tend to create a sea-going and shore division of the corps, for which reason I believe most emphatically that they should *not* give their entire attention to their specialties but must keep up with the other subjects required of a naval medical officer.

Although there are some senior medical officers of the Navy who are in favor of intensive specialization, it is evident that those who are in a position to judge the relative value of general versus special training are in accord as to limitation of specialization in the Navy. *From a practical standpoint the Bureau of Medicine and Surgery's present policy, as expressed in Commander Smith's article, would seem to solve the problem.* For the greater efficiency of the corps it is undoubtedly wise to con-



centrate on the training of medical officers for general duties as military surgeons, competent to be sent to any of the varied duties the service demands. If a young medical officer elects to devote special attention to any one branch it should not be at the expense of the other branches.

It is well to remember that Admiral Rixey, when Surgeon General, developed a corps of operating surgeons by requiring all the younger medical officers to operate under the supervision of the senior surgeons. Although some showed greater skill and aptitude than others, the majority were prepared to handle any emergency operations and routine surgery which occur in the Navy. In a similar manner, by change of service at naval hospitals, assistants can be trained in the general duties of medical officers by working under the supervision of older men in charge of the surgical and medical service, laboratory, X-ray, eye, ear, nose and throat, etc. After a reasonable period of varied service, say ten years, which should include at least one tour of hospital service, medical officers might be permitted to take courses to develop a chosen specialty. By this time there will be a background of experience in general practice, which should be required not only for military but for civilian specialists, if their opinions are to be sound and not biased by their specialty. The Bureau of Medicine and Surgery by means of efficiency and other reports are able to know which medical officers have attained proficiency in various specialties. In assigning duty this would be kept in mind and the work of the Medical Department as a whole conducted more efficiently.

In view of the difference of opinion among medical officers as to the need of specialists in the service, it is believed that a discussion of the subject is timely and will help to clarify the situation. Let us not forget, however, that well-trained military surgeons are in reality a corps of specialists requiring their best efforts to keep qualified for the many duties they may be called upon to do. When we further specialize the military specialist it should be with a clear understanding of how to guard against the dangers of over-specialization.



## PUBLIC BATHS AND PUBLIC ATHLETIC AGENCIES AS FACTORS IN RAISING THE PHYSICAL STANDARD OF AMERICAN YOUTHS FOR MILITARY SERVICE

BY MAJOR CHARLES C. DEMMER

*Medical Corps, United States Army*

IT IS but recently that this country emerged from the greatest armed conflict which the world has yet known. In no sense whatsoever a military nation, with an ill-defined military policy, almost wholly unprepared, in the comparatively short time of twenty months our country contributed its share to the complete and fitting victory of the allied armies. Many stupendous and apparently insurmountable tasks were met and overcome; many things heretofore considered impossible were accomplished with astonishing and incredible swiftness. This should and will be forever to us a source of just pride. With what patriotism each and every citizen put his or her hand to that work which fell to his lot cannot be fittingly described by tongue or pen. How unhesitatingly and willingly the remotest township responded when called upon for its quota of man power for the fighting force was but a reecho of the spirit which gave our country its birth. The knowledge of these things has been spread to all our people so that they may learn and profit by the events of the past. All this has been made a matter of record in our history, that future generations may profit by the lessons learned during this terrible struggle.

There are some of the lessons upon which we cannot look with pride, particularly the striking and deplorable fact made known by the examining boards throughout the land that one out of every three of the youths of our country selected for military service was found unfit. This fact should be made known to all our people and its importance so indelibly impressed upon the national mind that steps will be taken to forever insure against the recurrence of a similar situation. One cannot estimate the benefit to the individual and to the nation could we eradicate defects so plainly shown to be present in our youths of military age. The average person is apt to feel that this is of no consequence now—that things will right themselves as time goes on. We find it easy to forget the lessons taught at the expense of so much pain and sorrow. The general public has not the time or the inclination to institute and carry on measures designed to correct these defects. This work must be kept alive and directed by the small group of farseeing and patriotic citizens such as this society represents.

At a meeting of a Board of War held September 5, 1777, it was

ordered that Dr. B. Rush be requested to republish in a small pamphlet certain directions for preserving the health of soldiers. Thus we see at the very beginning of our national army those in authority recognized the great importance of a healthy body and a high physical standard in the maintenance of military efficiency. Dr. Rush was at one time Surgeon General of the Middle Division of the Revolutionary Army, and though he published many articles on medical subjects, so far as known this was the only one of a medico-military nature. Let me offer two quotations from this most interesting pamphlet:

Too much cannot be said in favor of cleanliness. If men grew as speedily and spontaneously as blades of grass on the Continent of America, the want of cleanliness would reduce them in two or three campaigns to an handful of men. It should extend, (1) To the body of the soldier. He should be obliged to wash his hands and face at least once every day and his whole body twice or three times a week, especially in summer. The cold bath was part of the discipline of the Roman soldiers and contributed much to preserve their health.

Written nearly a century and a half ago by Benjamin Rush, one of the most eminent medical men of that time, this small, compact pamphlet is filled with most valuable instructions relative to personal hygiene and could be read with pleasure and profit by men of every walk in life. In the last paragraph of his work he addresses the officers of the army as follows:

Fellow Officers: Consider that your country and posterity look up to you for the preservation of the only means of establishing the liberties of America. The wisdom and eloquence of writers and orators have long since yielded to the more powerful oratory of the sword. All our hopes, therefore, are in our army. But if anything can be added to these motives, consider further that there is scarcely a soldier under your command who has not a mother, a wife, a sister, or a child. These helpless members of society made great sacrifices to their country when they urged the beloved objects of their affection to follow the recruiting drum to the camp. Whenever, therefore, your duty requires that you should attend to the health of your men, imagine you see one or perhaps *all* of their female and helpless relations standing at the door of your tent or quarters and beseeching you, by the remembrance of the pleasures you have enjoyed and by the prospect of the pleasure you expect, to repair immediately to the tents or the huts of your men and, to attend to everything which reason and conscience tell you are necessary for the preservation of their health and lives.

Did we not know that the above was written in 1777, how easy it would be to believe that it was issued subsequent to and inspired by the terrible months of the war so recently ended. Surely the fires of patriotism should not burn less brightly in the days of 1922 than in

those of 1776. The high physical standard for the military youth of our country toward which we should always be striving is today just as dependent upon a healthy body and mind as it was in 1777.

That the United States was able to create the huge army eventually mobilized, trained and sent to the battlefields of France was due largely to the wise provision of Congress, the selective service act. This congressional measure provided a swift, effective and just means of securing men necessary for the prosecution of the war. This at once determined that the entire man power of the country should be called for service in such work as those in office judged to be of the greatest usefulness to the nation. With what success and satisfaction this worked out is now a matter of history. We know that in the future all will be subject to call when needed for the defense of the country. It is upon the shoulders of the citizen soldier that the responsibility for the preservation of our republic will fall in the years to come. With this knowledge that all of suitable age may be called for military service should the necessity arise, how important it becomes that their health and physical condition should be maintained at the highest possible standard. We may not live to see this ideal realized, but we can at least do our utmost to better conditions by every reasonable means at our command. Among the various means which must assist in the acquiring and maintaining of a high physical standard and the increasing of bodily vigor is the use of public baths and athletic agencies. The American people are just beginning to shake off their apparent lethargy in this regard. They are but now awakening to the immense benefits of the above named institutions. That the salutary and beneficial effects of these agencies were known and recognized early in our national life we have shown in the quotation from Dr. Rush's pamphlet given above.

Pliny, the great Roman author, has stated that for six hundred years Rome needed no medicine but the public baths. These baths, finished in most lavish splendor, were available for rich and poor alike, and bathing became a part of their daily life, even at times becoming a part of their religious tenets.

Major Louis Livingston Seamen, in his interesting and instructive address before the Society of Military Surgeons in 1905 entitled, "The Real Triumph of Japan or the Conquest of the Silent Foe," has most clearly shown the value of educating a people in all the modern aspects of hygiene and sanitation. He showed beyond doubt the Japanese learned that the securing and maintaining of the health of a nation was more advantageous, more profitable and much less expensive in life and money than restoring that health once it was lost. It was this knowledge of hygiene and sanitation which enabled Japan to place in

the field an army whose personnel was of a high standard of physical fitness and to keep the strength of their army at the front at the required maximum. It undoubtedly served to reduce the number incapacitated by disease to a minimum heretofore unheard of. These factors did far more to secure for them the victory over their larger and more resourceful enemy than the people of Japan themselves realized. The Japanese passion for bathing is well known. With them cleanliness is the first of all virtues and the daily bath the first of all duties. Their public baths are available everywhere even in their most distant villages. That they are a sturdy, vigorous race with great powers of endurance is in no small measure due to the national habit of the daily baths.

Dr. Baruch, in his "Principles and Practice of Hydrotherapy," has definitely shown the beneficial and wholesome effects of water in health when applied in the form of baths, both hot and cold. In no other country in the world do so large a percentage of the people have the advantages of a bath-tub or shower in their private homes as in the United States. There is, however, to be considered, and more especially in our densely populated cities, the very large number of people whose homes are not equipped with a bath in any form. It is chiefly for this latter class that there should be provided public places where for a small sum a bath may be obtained. In the providing of such an opportunity he who avails himself of it not only leaves the place with a physically clean body but at the same time cultivates the habit of cleanliness, acquires a certain self-respect and becomes a more healthy and more useful member of society. It was when failure crowned his efforts in 1873 to secure the establishment of baths in the city of New York for which he had been untiringly working that Sanitary Inspector Stuyvesant F. Morris wrote, "So the great unwashed must remain unwashed to the great detriment of their health and that of the city," and, allow me to add, to the great detriment of the nation.

The object of public baths is to promote health among the people by means of cleanliness. It is not required that these be located in magnificent buildings with luxurious appointments. They should be serviceable, clean, and inviting, properly heated, lighted and ventilated and so managed as to make the use of them a pleasure. Provided with these facilities bathing among the large mass of people will to a great extent become a habit, and increased care of the body will bring with it increased strength and force of body and mind. At the same time the principles of personal hygiene will have been learned, the value of clean clothing and underwear appreciated, and the spread of contagious diseases which find fertile soil in the presence of filth and uncleanness will be lessened to a marked degree. Habits of systematic exercise,

deep breathing, employment and development of muscles long unused, or rarely so, which the use of baths and swimming necessarily brings into play will all contribute to the general development of physical and moral strength.

Speaking from a personal observation extending over a period of thirteen years in the examination of applicants for enlistment in the military service, the need for more general education in the use of baths and bathing is most apparent to me. Young men of average schooling and intelligence, with a manifest refinement, will present themselves for examination when it is plain that they have not bathed for many days. This condition is not due in all cases to a lack of desire for clean bodies. Many times, especially when the applicant was from one of our larger cities, I have often found it to be to ignorance of the fact that a bath could be had practically for the asking. General education of the public that such baths do exist and in the use of them should do a great deal to correct this defect. On the other hand, the benefit of such training and education as indicated above is frequently seen in the examination of those men who are known in army circles as previous service men. One with a little experience can almost invariably pick out those who have had previous service by the cleanliness and neatness learned during an enlistment in the Army.

Kipling, who has immortalized the British soldier in song and story, has embodied all of the above in concrete terms when he wrote: "The soldier may be depended upon to do his whole duty when he has learned to fear God, shoot straight, keep clean and honor the state."

To properly present the vast subject of public athletic agencies as factors in raising the physical standard of American youths for military service would take far more time than this paper would permit. The fact that America stands today the leading nation in the fostering of public athletics is universally acknowledged. Here every schoolboy, from the lad who attends the modern, efficient schools of our large cities to the one who spends the winter term in the far-off district school, dreams of the day when he shall become a possible Olympic champion. Even in the smaller towns and villages the youth of our country have at their command almost any class of sports free of charge. Many of our public parks are equipped with tracks, jumping pits, ball diamonds, golf links, tennis courts and other apparatus for the various forms of athletic exercise. Municipalities are each year devoting more and more attention to this department. More equipment is being supplied and great enthusiasm is fostered and sustained among the participants by the organization of teams, leagues, etc. It is to the credit of the people of Buffalo that they have been so provident in this

regard. The taxpayers of the city, together with those who have given of their time and energy to perfect these public games, have done much for the common good. Remember, the youngsters who romp about your playgrounds today are the men and women of tomorrow, and in their hands shall rest the destinies of your truly beautiful city.

Physical training develops the body, imparts habits of discipline and provides healthy, agreeable exercise with life in the open air, assuring to the participants all the benefits that must follow therefrom. Such vigorous and energetic training must of necessity be accompanied by cleanliness of living, and this but serves to inspire all who participate toward higher ideals of life, to better citizenship, to self-sacrifice and willing service to country and to neighbor. Public athletics, encouraged and promoted by those in authority, not only aid in the training of healthy and active citizens and the raising of the physical standard, but also disseminate a wider knowledge of the principles of personal hygiene and sanitation. Nor should it be forgotten that a healthy body is not the only gain resulting from well-ordered athletic activities. When conducted in the correct manner, athletic games promote those higher valued and esteemed attributes of character which are admired and necessary in the civilian and soldier: firmness, endurance, self-control, decision, leadership and courtesy. They serve to inculcate and impress upon the youth of our nation the truly splendid spirit of loyalty and unselfishness.

Recently a manifestation of this very spirit won the hearts of the thousands gathered at the annual intercollegiate meet in Franklin Field, Philadelphia. Shields, the star Penn State runner, in his effort to pass Connolly, Georgetown's crack miler, accidentally tripped him. Shields immediately stopped, beckoned to Connolly to start again and, when the latter had a lead of 5 yards over him, resumed running. There you have, after all, the true American spirit. It won the admiration of the world for the American soldiers during the late war. It is the spirit which would not permit our men to lose heart, but which carried them on to victory. Certainly our recent experience has taught that the time and energy spent in the athletic training of our soldiers were of the highest benefit to our nation.

Before concluding the consideration of athletics as regards the standard of physical fitness for military service, let us learn a lesson from the history of the Ancient Greeks. The high physical development of that people is a fact well known to you. As you have often read, in Ancient Greece every citizen was a soldier, every Greek ready to take the field at a moment's notice in the defense of his country. Every Greek could swim, for an inability to do so was as much a sign

of an uneducated person as ignorance of letters. In the fifth century before the Christian Era athletic exercises formed the basis of all Greek meetings, while in the fourth century B. C. these exercises assumed more of a military character.

In "The Evolution of the Olympic Games" written in 1914, Mr. Webster of England, referring to the youths of his country, says: "If we are to fend our shores in the future as in the past, then our young men must awaken to their duty and must train themselves in manly pastimes in order that they may play that greater, sterner game of war for the defense of hearth and home if necessity shall ever arise." In that same year millions of England's youths were called for the very purpose of which he wrote.

Can we not take some heed of this valuable advice and apply it to our own land. While it is the sincere prayer and hope of all that the hand of war may never again be spread over our land no one can positively say that such may not be the case. We aim at a peaceful prosperity of our country, but we insist that our rights be respected and should be prepared to vindicate them if unjustly attacked. Therefore every reasonable and just means should be encouraged which will better fit the youths of our nation to play their part in the event of such an emergency.





## SOME CHANGES THAT HAVE TAKEN PLACE IN THE DUTIES AND ACTIVITIES OF NAVAL MEDICAL OFFICERS, AFLOAT<sup>1</sup>

BY CAPTAIN CHARLES E. RIGGS

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IT IS not necessary to go back a great number of years in order to observe a marked contrast between the present-day duties of the medical officer afloat, and those of former years. Most people think of the transition from wooden to iron ships and from canvas to steam as the period of the greatest revolutionary changes in the Navy. As a matter of fact, the greatest changes have been during the more recent period of the development and perfection of the modern battleship.

The evolution of the naval medical officer has been influenced by several lines of progress. The remarkable advance made in naval construction has brought about many changes in environment on board. Scientific medicine has reduced and, in some instances, actually obliterated certain important diseases of thirty years ago. The broadening scope of general medicine, in particular in the field of preventive medicine, has brought about increased usefulness of medical departments in producing military efficiency, which fact has received more or less general recognition.

In order to appreciate the material changes of environment, a few comparisons between the U. S. S. *San Francisco*, the flagship of the North Atlantic fleet of thirty years ago, and the U. S. S. *Maryland*, the present flagship, are sufficient. The new flagship is nearly twice as long and twice as broad as the old one. Instead of displacing 7,000 tons, the modern ship displaces 37,000 tons. The old ship burned coal, had two reciprocating engines and two screws. The new ship burns oil, has turbine engines, electric drive, and four screws. The old ship carried a crew of 386 men, the new one about 1,600 officers and men. In one respect that I can think of there has been no change—the old flagship carried a fleet surgeon and two medical officers, and the new one carries the same.

Besides these remarkable material changes in the environment of medical officers afloat, there are various changes to be noted concerning their professional work. For the most part the changes have been in the nature of betterments, but there are some exceptions. Among the factors that have operated for improvement are the advance made

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.

in scientific medicine, the greater attention paid to preventive measures and sanitation and hygiene, and, what is practically new, a desire to promote good health as something different from the mere absence of disease.

The results of the operation of these various factors may be classified roughly as follows:

1. A change in the number and kind of disease with which medical officers aboard ship now have to deal.

2. Greater activity along the lines of preventive medicine than formerly.

3. A more complete cognizance of the living conditions that actually promote good health. A few examples of each will be taken up in this order.

First, let us examine some of the changes in morbidity rates. In this diagram are given the rates per 1,000 for certain selected diseases of the Navy, afloat, for the years 1892 and 1922. In the former instance the rates apply to the entire service afloat and in the latter to the Atlantic fleet of the present time. The Atlantic fleet of today is more than twice as large as the entire service afloat in 1892, but this is only of incidental interest, as the columns represent admission rates per 1,000. The dark columns are the older service and the shaded ones the newer. The twelve diseases given here, with the venereal diseases, comprise about one-half of the total admissions for disease of the former period and somewhat less than one-half for the latter.

If we look at this diagram somewhat as one would look at a temperature chart there are two impressions to be obtained: First, the shaded lines reflect a healthier body of men than do the dark ones; and second, the diseases of the present Atlantic fleet have a tendency to show themselves in a few columns or, in other words, are less evenly distributed than formerly. Concerning the comparative health of the two groups, the rate for the service afloat in 1892 was 742, and in 1920, the latest available returns, it is 526.

The selection of these diseases for comparison has been determined by two considerations: First, it was considered desirable to include all diseases having numerical prominence, which has been done with the exception of acute enteritis; second, certain diseases not of numerical prominence but of special military interest are also represented.

Let us go hastily across this diagram from left to right to see what has happened. Alcoholismus, typhoid fever, and smallpox have disappeared. The first explains itself. Typhoid and smallpox (and practically vaccinia) are kept out of the fleet through good and improved administration at our training stations by which all men destined for

the fleet are immunized against these diseases. To thoroughly accomplish this immunization at training stations before men are sent to the fleet requires a peculiar and by no means simple organization which must be administered with constant vigilance. The absence of typhoid fever and smallpox for the past eighteen months from this fleet of over 25,000 men, many of whom must have been exposed to these diseases in various parts of the world, is a tribute to the thoroughness of the immunization work at our training stations and, in particular, the training station at Hampton Roads, Va., from which most of the men of the fleet have been received.

The admissions for articular rheumatism have fallen from about 40 per 1,000 to an almost insignificant number. It is an interesting speculation as to what has become of the acute and chronic rheumatism of the old navy. When iron ships were first used it was apprehended that the dampness of living quarters, due to the condensation of moisture on the steel bulkheads, would cause a hygienic defect tending to induce rheumatism. In fact, for a number of years cork paint was used to correct this condition, but the practice has long since been discontinued.

The secret of the practical disappearance of rheumatism from the diseases afloat probably lies in better ship's hygiene and in the application of the newer knowledge concerning the pus-forming organisms. The later methods for the treatment of infected teeth, tonsils, sinuses, and other pus foci have eliminated a great deal of poor health among the enlisted personnel and, without doubt, have contributed to a considerable extent in the prevention of rheumatism.

Tonsillitis is one of the two diseases which appears to increasingly thrive in the new Navy. The admission rate for this disease has about doubled. In the latest report from the Atlantic fleet tonsillitis constitutes one-half of the admissions for the communicable diseases, and the communicable diseases amount to 22 per cent of all admissions. Aboard ship, tonsillitis occurs in small epidemics that seem quite independent of unfavorable climatic conditions. In fact, the largest and severest outbreak of this disease I have seen afloat took place on a ship serving in tropical waters.

The diseases of the pus-forming organisms—that is, boils, abscesses, and cellulitis, with pneumonia and tuberculosis—have a decline of about 50 per cent each. These declines are due probably to better sanitation and hygiene, in particular personal hygiene. Malaria is almost absent, because few of our vessels cruised last year in malarial infected ports in Central America and the West Indies. *Febris continua simplex* has been replaced in our nomenclature by fever of unknown cause, and its practical disappearance probably means nothing further

than better diagnostic facilities. The amount of influenza has increased, but this has little significance in regard to ship sanitation. It is likely that the appearance of this disease on board ship merely reflects similar conditions on shore. The infection on board is usually more severe than the corresponding one ashore, and it burns itself out quicker.

When the increase in influenza here shown was first noted it was expected that part of the increase was occasioned by medical officers making the diagnosis of acute and chronic bronchitis less frequently than formerly. An examination of available statistics does not bear out this assumption. It shows, in fact, that there is now relatively more bronchitis than formerly. Influenza is not a clean-cut clinical entity, and there is no criterion by which the infection may be recognized. Aboard ship the diagnosis of acute bronchitis is always loosely made from the general symptoms alone. Acute influenza, especially during non-epidemic periods, is often called acute bronchitis. Also, acute nasopharyngitis and tracheolaryngitis give the same general symptoms of cough, fever, and muscular soreness as acute bronchitis and are liable to be recorded as bronchitis or influenza. Apparently in the new Navy the total of these diseases has increased both relatively and actually. But the diagnosis of each is still arbitrarily and unscientifically made. Consequently, until we can and do diagnose these allied afflictions with greater accuracy than is the case at the present time, the statistics concerning the prevalence of each of them will lack reliability and must be interpreted with considerable caution.

During recent years the prevention of the venereal diseases has received considerably more attention than formerly. The figures of thirty years ago have practically no statistical value. The first statistics of any real value began about ten years ago when it was required to admit to record all venereal infections. Since then prophylactic treatments were introduced and the records of these treatments have added greatly to our knowledge of the venereal disease problem and also the venereal problem. One of the most useful means of keeping track of the venereal situation of a command is the keeping of a so-called prophylactic record or table. Colonel Harrison, of the British Ministry of Health, characterized the introduction of the use of this table as of epoch-making importance in the history of venereal disease prevention. Here is one of these tables which is a summary of the tables from the vessels of the Atlantic fleet for the past twelve months. You will see it naturally divides itself into two parts, namely, those infections occurring after taking prophylactic treatment and those infections when prophylaxis was not administered.

Now let us examine this table and note some of the respects in which

it is informing. In the first place it gives us the numbers and kinds of infection, but that is not new, as we have been collecting such statistics for some time. Here the total number of infections amounts to 2,387 and the total treatments 35,130. The most interesting column is this one of percentages, which indicates the efficiency of prophylaxis as administered for each hour subsequent to exposure. It is seen that the efficiency of the treatments is according to the nearness of the treatment to the time of exposure. In this particular table I think the percentages of the failures are too high for the first, second and third hours. This is probably due to misstatement by those taking treatments or, perhaps, to poor administering. However, the error must be pretty evenly distributed, as you will note the increase from hour to hour has no exception.

There are two phenomena to be looked for in this column, one of which is manifested here. The one present is the great increase in the infections of the second hour over those of the first. It usually amounts to 100 per cent, and it is almost that in this case. Also there is often another large increase in percentage in passing from the third to the fourth hour, but there is none shown here. It is believed by most persons that treatments later than four or five hours are without value. Accordingly after the fifth hour the percentage of failure should be a constant figure, but that is not the case in this table. One is inclined to believe that the gradual increase exhibited here is not purely accidental. There are several interesting deductions that may be made from this table and just two more will be mentioned. If one wishes to determine how much actual prevention is being accomplished for the trouble and expense that is involved in administering prophylaxis, and it is considerable, that may be done by considering the treatments of more than twelve hours as having no preventive value, or, in other words, as the normal rate of infection without prophylaxis. Then 7.8 per cent of 35,130 gives 2,740 diseases as the number that would have taken place without prophylaxis. But only 1,244 actually occurred; consequently the trouble and expense prevented the difference, or 1,496 venereal diseases. Another point is a disturbance which occurs in the proportion of gonorrhea to syphilis when prophylaxis is used. I am quite certain I have seen the proportion of syphilis to gonorrhea under normal conditions stated as one to five. Of course the proportion will vary in different communities. In this instance it is without prophylaxis as 1 is to 6.59 and with prophylaxis as 1 is to 12.84. From this it is seen that the treatments are most effective against syphilis, and it is probable they are least so for chancroid.

The venereal situation may vary in different localities and from

time to time in the same locality. The period of the World War, and subsequently, witnessed considerable propaganda for the suppression of the venereal diseases. It is to be expected that in many instances the result is not always the one that was originally intended. The enlisted man today is more sophisticated concerning venereal matters than formerly. It would seem that the sophistication which he has recently acquired concerning these subjects has resulted more in his adopting means to avoid the physical consequences of his moral transgressions than it has in bolstering up his better inclinations.

The propaganda for the prevention of the venereal diseases among the enlisted personnel is now resulting in considerable good. The moral appeal certainly has done no harm, and it may have done some good. The educational part of the propaganda has borne home to the enlisted man two main facts. One is that the venereal diseases are seriously harmful, so that it is very much worth his while to avoid them. The second educational item which the enlisted man now carries with him is that practically all promiscuous women are diseased and therefore dangerous to him. This knowledge which he now takes ashore with him seems to have two effects. The first effect is a restraining one caused by fear of disease, and the second one induces him to use intelligently, when exposed to disease, one or more of the various devices for disease prevention.

We are told that the three great movements to the increase of human efficiency are preventive medicine, eugenics, and scientific management. Preventive medicine is so new a study that its existence and meaning are still unknown to many informed persons. It has probably reached its greatest advance in the military services. Even in these services the wonderful contribution of preventive medicine to military efficiency is understood by only a few persons, notwithstanding the records of recent wars furnish abundant statistical testimony. There always has seemed to be a strong tendency to fight the next war from hypothetical considerations rather than to draw lessons from the experiences of past conflicts. In the Navy, in particular, it has been attempted to read something into the future almost regardless of the lessons of the past. For instance, a few years ago torpedo boats were to destroy capital ships, and after the torpedo boats came the submarines. Nowadays the capital ship is to be destroyed by bombs dropped from the sky by airplanes.

Probably no one has taken the pains or had the temerity to forecast for the next war the relative fatalities from gunfire and disease. Looking into the past it is found that during the Mexican War the death toll from disease was to that from gunfire about as eight is to one. During the World War it was as one is to one. It goes without saying

that preventive medicine has been the big factor in effecting this change. If scientific medicine continues its conquest over disease, there will be a further reduction in disease mortality during war. It is inconceivable to have real hostilities without fatalities. Therefore the further change effected by scientific medicine may be expected to have the appearance of removing the fatalities from the disease column and placing them in the killed in action and died of wounds column.

For some reason the public still thinks of the cure of disease instead of prevention. It asks for quarantine and the support of hospitals and sanitariums rather than for medical inspections and a knowledge of the rudiments of hygiene and sanitation. The public does not yet understand that the manifestation of disease should be a last call, not a first call, to action.

However, in the military services, many officers of high command appreciate the changed conditions. For instance, in the regulations for the government of the services afloat the Commander-in-Chief devotes four paragraphs to health protection and promotion, one of which reads as follows: "The Commander-in-Chief desires that service conditions afloat shall be as nearly as possible such as will tend to promote a high standard of physical perfection. Cognizance shall be taken of the food, clothing, living quarters, hours of work, athletic exercise, recreational and leisure time activities of the personnel in order that these factors may contribute as much as practicable to the health of those concerned. Positive good health increases efficiency and is a step in advance of mere absence of disease."

These general instructions are indicative of some of the ways in which the duties of a medical officer aboard a modern battleship have broadened from the restricted or narrower line of duties of thirty years ago. This development or evolution has not been altogether unforeseen. Many of the experienced medical officers of the old Navy, in addition to their sick call duties, stressed the importance of ship sanitation and hygienic measures. But the fuller realization of what they had in mind had to wait for later advances in scientific medicine and, of course, the evolution of the modern battleship.

We are in one respect in the same position in which we were some thirty years back—that is, there are still what seem to be just as important problems in disease prevention and health promotion awaiting solution. It seems, though, that we are working from a firmer foundation than did our predecessors, for it is now understood that good health is not a passive but an active entity. We now believe that positive good health is something more than the mere absence of disease and that its existence among a body of men is an active force that is bound to find expression in greater efficiency and in other forms of good.

# BRONCHO-PNEUMONIA, WITH SPECIAL REFERENCE TO INCIDENCE AND DIAGNOSIS<sup>1</sup>

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(With four charts)

During the past three years, while on duty at the Naval Hospital at Annapolis, our attention has often been directed to the frequency of broncho-pneumonia among robust, active young adults who constitute the greater proportion of patients at this institution. This fact has been noted particularly during the periods when the admission rate was high for such diseases as acute bronchitis, influenza, acute pharyngitis and acute follicular tonsillitis.

The diagnosis of broncho-pneumonia frequently offers considerable difficulty, and one should never neglect to make a careful examination of this type of case before assigning the cause of disability to such relatively simple affairs as acute bronchitis, pharyngitis or even influenza.

There appears to be considerable hesitancy in making the diagnosis of pneumonia on patients who feel comparatively well, have only a moderate fever and little cough or expectoration, and the tendency is to rule out the presence of a pneumonia by the temperature chart and the mildness of the symptoms rather than by a careful examination.

Pneumonia has come to be associated in our minds with a rather definite group of symptoms and signs. We immediately picture an individual with labored, rapid respiration, irritating cough, high fever, flushed skin and bounding pulse who shows the usual physical signs of consolidation and who runs a more or less prolonged course. This mental picture is apt to prejudice us and give a false sense of security in patients whose picture is entirely different from this concept.

Again, we have been taught that broncho-pneumonia occurs most frequently at the extremes of life. Its tendency to attack the very young and the old have been stressed, which leaves us to infer that it is relatively infrequent at other periods of life.

We are on the alert to detect broncho-pneumonia occurring as a complication of the acute infectious fevers, particularly measles, whooping-cough, typhoid fever and diphtheria, but we frequently show less zeal in searching for it in patients without such an antecedent history and who may present subjectively nothing more than a "bad cold."

Foster has emphasized this point and states that the reason broncho-

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.



pneumonia at times escapes detection is two-fold. First, the physical signs are frequently transitory; and second, the patient may not seem sick enough to excite careful examination.

The point may be raised as to the necessity of all this special effort to detect small areas of consolidation. If these patients are only mildly ill, and if they usually recover without any untoward symptoms or complications, why should one exercise such care to make the diagnosis of broncho-pneumonia? The answer is that, while most cases may recover completely without ever having been suspected of having pneumonia, a certain number will develop complications, or the pneumonic process may extend until it becomes a serious menace to life. If the nature of the disease process is recognized early, adequate precautions and a longer convalescence follow as a matter of course and the patient's chances of escaping a serious illness are immeasurably increased.

The symptoms of a broncho-pneumonia vary greatly. The patient may complain merely of malaise, headache, slight cough and soreness of throat. There may be only slight pyrexia, and the case may be regarded as merely an acute bronchitis or pharyngitis or coryza. Probably the most frequent diagnosis, at least in recent years, will be influenza. The more severe types of broncho-pneumonia, however, at once excite suspicion, and the severity of the symptoms leads to careful examination of the chest. The fact that the pneumonic process may begin mildly and involve only a small area does not signify that it will continue as a mild process. At times the small areas of consolidation continue to extend and what began as a "cold" may end with consolidation of entire lobes.

The diagnosis of the severe, frank pneumonia is seldom difficult, and the physical signs are, as a rule, unmistakable. It is the milder types involving only a small area which require all our skill to detect. The physical signs which one should look for and which will frequently establish the diagnosis are:

1. Alteration in the normal breath sounds.
2. The presence of râles.
3. Changes in conduction and character of whispered voice.
4. Changes in resonance.

The tendency for broncho-pneumonia to attack the lower lobes is well known, although occasionally it is confined to an upper lobe. When involving an upper lobe the question of tuberculosis is frequently raised, and it may be necessary to secure evidence in addition to the physical signs before deciding as to the etiological factor.

If the pneumonic process does not approach the chest wall, physical

signs may be entirely lacking. As a rule, however, at some time during the course of even a mild broncho-pneumonia, signs are present which lead to the diagnosis.

The change in character of the breath sounds may be one of pitch rather than intensity, and a localized area showing this change is significant.

Râles can usually be elicited over these areas and are usually associated with the finding of acute bronchitis.

The change in transmission of the whispered voice is a very valuable sign and should never be neglected. Frequently a small area of consolidation may be localized by this maneuver, and in moving the stethoscope over the chest wall one is frequently startled by the sudden change in character of the whispered voice noted over a small, rather sharply circumscribed area.

Changes in resonance over small localized areas is always significant and, in conjunction with the signs noted above, may establish the diagnosis.

However, there is often no change noted on percussing these small areas, and the diagnosis not infrequently must be made without any impairment of resonance being found.

The favorite site for detecting these changes from the normal is posteriorly at the lower angle of the scapula on either side. However, a broncho-pneumonia may involve any area of lung, and one should never be content with anything less than a complete overhaul of the chest wall.

As an aid in diagnosis and as a means of confirming our physical findings, the X-ray is invaluable. With the proper technique small areas of consolidation may be visualized and sometimes unsuspected areas brought to light. We have made it our practice after a careful physical examination to X-ray these patients. This is a most stimulating and helpful procedure and tends to put the physical examiner on his mettle, as well as to aid him materially in interpreting the signs he has just noted.

However, one must use care in interpreting X-ray plates. A broncho-pneumonia involving the upper lobes may be indistinguishable from tuberculosis from an X-ray standpoint, and one should not be lead astray in these patients and make a diagnosis of tuberculosis only to see the lesion fade away and eventually disappear.

The course of a broncho-pneumonia follows no definite rule. Some cases with only small areas involved may clear up very quickly, in fact so quickly that your diagnosis of pneumonia may be questioned. It is here that your X-ray plate again becomes valuable in confirming

your findings. The physical signs frequently persist no longer than a day or two, and significant findings one day may disappear the following day.

From an X-ray standpoint the lesions, as a rule, clear up more slowly, and several days are usually necessary before these areas of consolidation entirely disappear. The areas of opacity tend to fade out gradually, leaving some blurring or peribronchial exudate which, as a rule, disappears in the course of a few days, although occasionally persisting for several weeks.

From the standpoint of pathology these findings are consistent. In describing the pathology of broncho-pneumonia MacCallum says:

On section the consolidated parts can be felt and can usually be seen as slightly elevated patches. . . . They vary in size from the minutest foci, which occupy only a few alveoli about the termination of a bronchiole, to large, confluent areas which stretch over a considerable portion of a lobe of the lung. . . . The healing of this type of pneumonia, brought about by the annihilation of the bacteria and the complete or partial liquefaction of the exudate and its absorption, occurs rather more slowly than in lobar pneumonia, and its retardation by the organization of the exudate into fibrous strands is more common.

If we keep in mind the pathology, it is not difficult to explain the great variability in the course, severity, symptoms and physical signs which occur in broncho-pneumonia. It explains the mild type of case with little or no pyrexia and with only a small area of lung involved, as well as the severe fulminating case with hyperpyrexia, dyspnoea, cyanosis and involvement of whole lobes. The former is just as surely a broncho-pneumonia as the latter, and whether the nature of the process is recognized or not does not alter the pathological facts in the case.

We have acquired the habit of expecting a certain intensity of reaction on the part of patients before bringing up the question of pneumonia, and those who fall far short of this point are apt to be regarded with complacency until some complication or extension of the process brings them within our pneumonic field of vision. This is particularly apt to be the case in active, robust young adults without an antecedent history to suggest a secondary invader.

As illustrating the type of patient to which we refer the following cases are reported showing temperature charts and X-ray prints.

It should be remembered that practically all patients at the Naval Academy are transferred to the hospital for treatment if they are unable to carry on their routine duties for more than a day or two. This accounts for the fact that this type of patient becomes a hospital case as a routine procedure at this institution.

## CASE I

White male; aged 18.

*Complaint:* Headache, sore throat, cough and general malaise.

*Family History:* Negative.

*Personal History:* Measles, mumps and whooping cough in child-

Diagnosis *Broncho-Pneumonia* Race *white* Age *18*



Day after Operation may be entered in red in the space for Day of Disease.  
Draw heavy lines to separate calendar days.

CASE I.—Temperature chart

hood. For past several years had no illness of any kind and was active and robust.

*Present Illness:* The day prior to admission to hospital he felt slightly indisposed and had a headache and some soreness of throat.

The following day he reported to dispensary and was transferred to hospital with the diagnosis of acute bronchitis.

*Clinical Course:* On admission, temperature 101° F.; pulse 90; respiration 20. Physical examination shows a well-nourished, muscular individual who appeared only mildly ill. The posterior pharynx was diffusely congested, and there was some discomfort on swallowing. Examination of chest revealed scattered râles at both bases, more marked at right base; otherwise the physical findings were negative. The white cell count was 11,850. Patient continued to run a mild course with temperature varying from normal to 99.4° F. On the fourth day an area at the right base was found which showed localized fine râles, some increase in breath sounds and high-pitched, rather loud-whispered breath sounds. This area was rather sharply circumscribed, and its diameter was about 4 cm. An X-ray of chest showed right hila shadow much increased. There was a small area of relative opacity at the right base at the cardio-diaphragmatic angle which indicated pneumonic consolidation. Patient continued to run a mild course as shown by the chart. On the tenth day the white cell count was 20,500. On the fourteenth day the temperature remained normal, and from this point on convalescence was uneventful. On the fifteenth day the white count was 16,000. An X-ray on the twenty-sixth day showed the pneumonic area almost resolved, although there was still slight relative opacity and prominent bronchial markings.

As will be noted on the chart, the temperature averaged well below 100° F. with pulse, as a rule, below 90 and with no increase in the rate of respiration. The patient at no time was acutely ill and, if allowed to follow his own inclination, would not have remained in bed.

#### CASE II

Male; Filipino; aged 22.

*Complaint:* Cough, headache, sore throat and general malaise.

*Family History:* Negative.

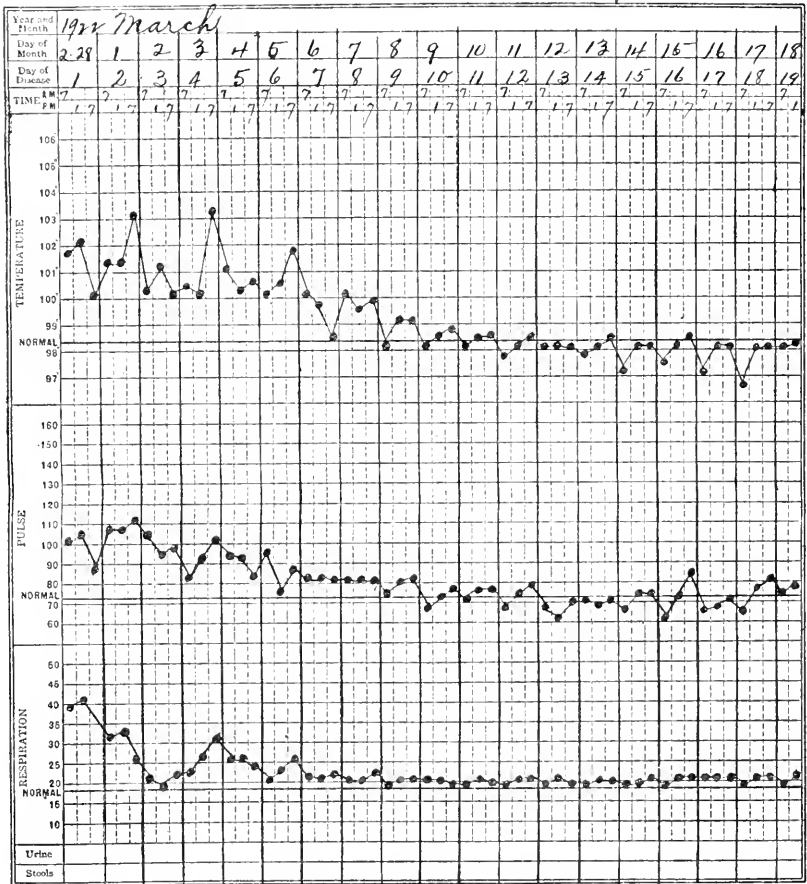
*Personal History:* Measles and mumps in childhood. Tonsillitis one year ago, following which health had been excellent up to present illness.

*Present Illness:* Two days prior to admission to hospital, patient developed coryza, accompanied by slight cough and general malaise. These symptoms gradually increased, and he reported to dispensary and was transferred to hospital with the diagnosis of influenza.

*Clinical Course:* On admission, temperature 102° F.; pulse 100; respiration 26. Physical examination showed a fairly muscular individual who appeared mildly ill. The tonsils were congested and showed a few areas of follicular exudate. The chest showed moist râles at the bases posteriorly and an area on the right side at lower angle of scapula about 3 cm. in diameter, over which were obtained harsh breath sounds, increased whispered voice and subcrepitant râles. There was slightly impaired resonance over this area. The white cell count was 9,500. X-ray of chest showed a small area of relative opacity at the level of the seventh rib posteriorly on the right side. Patient continued to run a fairly mild course with an irregular tempera-

ture. Sputum was negative for tubercle bacilli but showed numerous pneumococci. On the fourth day an X-ray of chest showed increase in size and density of shadow noted in previous plate. There were râles and definite increase in breath sounds noted over this area. The

Diagnosis *Broncho-Pneumonia* Race *Filipino* Age *22*



Day after Operation may be entered in red in the space for Day of Disease.  
Draw heavy lines to separate calendar days.

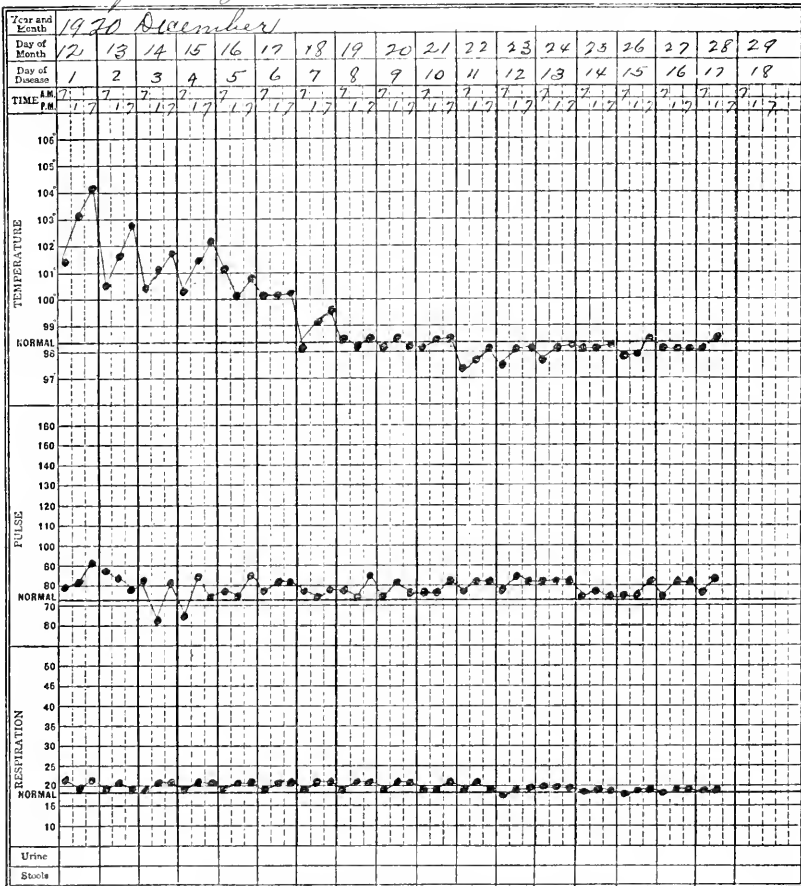
4-2408

CASE II.—Temperature chart

leucocyte count at this time was 10,900. On the ninth day the temperature remained normal and patient made an uneventful recovery from this date. On the eighteenth day an X-ray of chest showed only slight residue remaining at the site of consolidation.

## CASE III

White male; aged 18.

*Complaint:* Cough, headache, and general malaise.*Family History:* Negative.*Personal History:* Measles, mumps and whooping cough in child-Diagnosis Influenza Race White Age 18

Day after Operation may be entered in red in the space for Day of Disease.  
Draw heavy lines to separate calendar days.

CASE III.—Temperature chart

hood; occasional attacks of tonsillitis up to age of 15; health excellent up to present illness.

*Present Illness:* Began rather suddenly with general malaise, cough and muscular pains. Reported to dispensary and transferred to hospital with diagnosis of influenza.

*Clinical Course:* On admission, temperature 101.2° F.; pulse 76; respiration 20. Physical examination shows numerous, moist, bubbling râles occupying the upper left chest, particularly marked in left infraclavicular region with slightly impaired resonance and increased in the whispered voice sounds. The leucocyte count was 6,600. An X-ray of chest showed the following findings: "The hila shadow on the left side is enlarged and shows irregularly distributed dense opacities. Extending from its upper pole the bronchial shadows appear considerably indurated in a nodular fashion. Extending from this hilus with the base outward is a triangular area showing a very considerable opacity through which are visible the thickened bronchial trunks and scattered dense areas apparently occupying the parenchyma. The supraclavicular space also shows signs of beginning involvement. The location of the signs and their characteristics make the diagnosis of tuberculosis probable.

The patient continued to run a febrile course showing a daily evening rise of temperature. The temperature gradually dropped to normal and on the eighth day showed no further rise. The convalescence was uneventful from this time. On the sixteenth day the X-ray report was as follows: "The only signs of recent disease remaining are mottling and enlargement of left hila shadow, with slight relative opacity extending outward from hila."

This case serves to illustrate the marked resemblance to tuberculosis which a broncho-pneumonia may assume when involving the upper lobes.

#### CASE IV

White male; aged 21.

*Complaint:* Headache, cough, sore throat and general malaise.

*Family History:* Negative.

*Personal History:* Measles and mumps in childhood; influenza in 1918, mild case, good recovery.

*Present Illness:* Began with cough, general malaise and muscular pains. He was transferred to hospital with the diagnosis of influenza.

*Clinical Course:* On admission, temperature 102° F.; pulse 100; respiration 24. Physical examination shows a robust, muscular individual who appeared only mildly ill. There were a few coarse râles at both bases posteriorly; otherwise nothing of note. Patient continued to run a mild febrile course. On the fourth day a small area was noted at left base posteriorly which showed increased breath sounds and whispered voice, although no definite impairment of resonance could be elicited. X-ray of chest showed a small localized area of relative opacity at cardio-diaphragmatic angle on left side. On the seventh day the temperature remained normal and patient made an uneventful convalescence. An X-ray taken two weeks following onset of illness showed area of consolidation has practically disappeared.

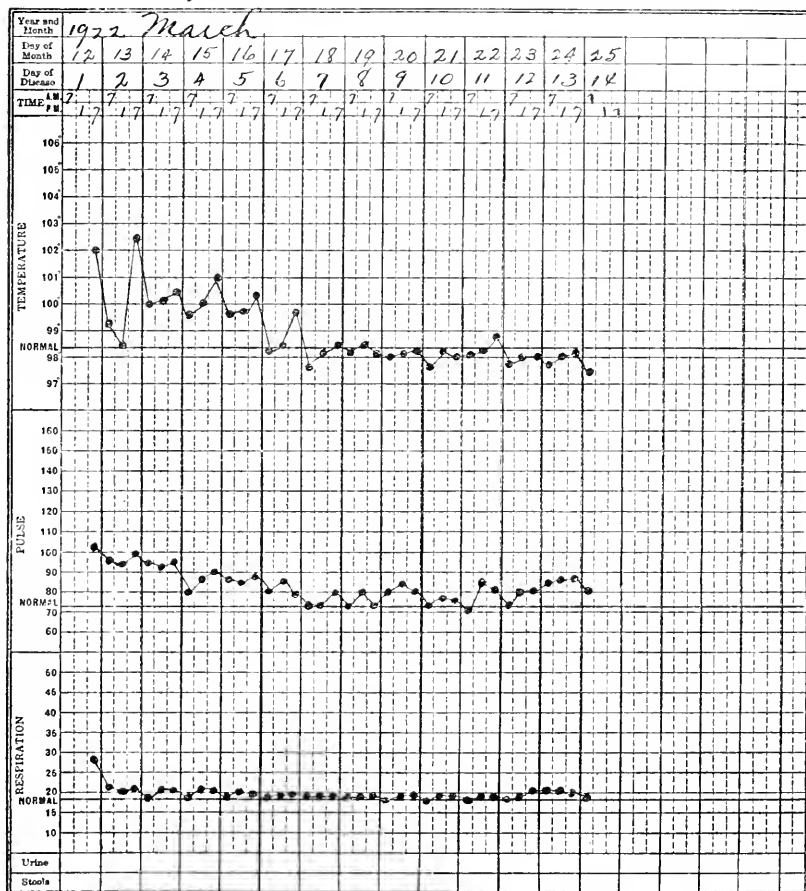
This patient was never acutely ill and would have been up and about much earlier had his pneumonia been overlooked, thus favoring complications.



These cases illustrate the mild type of broncho-pneumonia frequently seen among young adults and on whom the diagnosis was confirmed by definite X-ray findings.

It has been our experience also that many of the so-called "chronic

Diagnosis *Broncho-Pneumonia* Race *White* Age *21*



Day after Operation may be entered in red in the space for Day of Disease.  
Draw heavy lines to separate calendar days.

CASE IV.—Temperature chart

influenza" patients who run a mild but protracted course are in reality cases of broncho-pneumonia. Careful examination of these patients often reveals an area of consolidation which clears up the situation.

The importance of recognizing these mild types of broncho-pneu-

monia cannot be overestimated. The chances of complications arising are greatly increased in unrecognized cases, and the frequent occurrence of pleurisy or of some involvement of the heart following even mild types of pneumonia is sufficient reason for keeping these patients at rest over longer periods than would be allowed otherwise.

The data collected may be summarized as follows:

1. Broncho-pneumonia is a more common disease among active, robust, young adults than we have been led to believe.

2. Mild types of this disease may present no subjective evidence of a pneumonia and may be easily overlooked unless a careful routine examination of the chest be made.

3. In the absence of definite findings these cases are usually diagnosed acute bronchitis, influenza, acute pharyngitis, or severe coryza.

4. The X-ray as an aid in diagnosis is invaluable and will confirm physical findings as well as reveal areas of consolidation which present no physical signs. It is also of great value in determining the degree of resolution.

5. The importance of recognizing these mild types of pneumonia hardly needs emphasis. The danger of complications and sequelae in pneumonia is much lessened by adequate precautions and a longer convalescence which follow, as a matter of course, the recognition of the disease.



# THE EMERGENCY TREATMENT OF WATER FOR DRINKING PURPOSES<sup>1</sup>

BY MAJOR A. PARKER HITCHENS M.C., U.S.A.

*Army Medical School, Washington, D. C.*

WHILE working at the Army Medical School during the war, Major Lawrence T. Fairhall, S. C., made a careful study of the treatment of water in the Lyster bag for the purpose of working out a method which would be free from well-recognized objections (1).

In order to provide chlorine in convenient form and amount for the Lyster bag, the Medical Department supplies sealed tubes of calcium hypochlorite each containing one gram. This substance, when of full strength, carries from 30 to 32 per cent of available chlorine; the Lyster bag contains, when full, 36 gallons of water; thus the addition of one gram of hypochlorite to a Lyster bag full of water is equivalent to a dosing of two parts of chlorine per million parts of water.

This amount would be ample, and the simple procedure of adding the contents of one sealed tube of hypochlorite to the bag filled with water would be satisfactory were it not for two variable factors. The first is that polluted water always contains organic matter which has affinity for chlorine and, through combining with it, reduces the chlorine available for the destruction of the bacteria. Naturally there are no means for predicting the amount of chlorine fixing substances there may be in a given sample of polluted water, and such impurities are well known to vary tremendously.

The other variable factor, as Major Wood has recently shown (2) is the amount of chlorine bound to the calcium salt. The chlorine is but loosely combined, and certain uncontrollable influences, especially age, permit the separation of the chlorine from its unstable union. The freed chlorine is held under pressure until the tube is broken, when it escapes as a gas with explosive violence, the degree depending roughly upon the extent to which deterioration has progressed. Freshly prepared tubes containing hypochlorite of full strength at the time of sealing are likely to give satisfactory results, but when the tubes are more than a year old, and especially if they happen to have been improperly sealed, the amount of fixed chlorine present may be much reduced.

These, then, are the two variable factors whose influence Fairhall attempted to eliminate. As will be seen, he added the further procedure

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.

of dechlorination at the end of the treatment period in order to remove the disagreeable odor and taste of chlorine from the water.

The method is described as follows:

The contents of a tube of calcium hypochlorite (1 gram) are added to a Lyster bagful of raw water, stirring the powder in well and allowing the water to stand from ten minutes to half an hour, depending upon the physical condition of the water. A test should be made immediately after adding the hypochlorite to make sure that an excess is present, and it is desirable that a second test be made at the end of the sterilization period. These tests may be made simply by adding half an ampule of a solution of orthotolidine in hydrochloric acid to a small quantity of the treated water—contained in an ordnance cup, for instance. In the presence of free chlorine, a coloration is produced which ranges in shade from a light canary-yellow to a dark red, depending upon the amount of free chlorine present. At the end of the sterilization period, the rank taste and odor of the sterile water may be removed by adding one gram of sodium thiosulphate. The free chlorine is at once acted on by the sodium thiosulphate, and the water is ready for drinking. The small quantity of thiosulphate added is scarcely sufficient to alter the taste of the water; indeed, it is difficult to differentiate by taste between raw water and water that has been thus treated. The amount of sodium thiosulphate remaining after treatment is negligible, since only one gram is originally added to the 36 gallons of water and the greater part of this is used up in the reaction with free chlorine. In this method, the tube of calcium hypochlorite should be emptied directly into the bagful of water and rapidly stirred in by means of a stick. This stick should be left in the water throughout the whole process of treatment, for, if removed and then later used to stir in the sodium thiosulphate, it may serve to reinfect the water. If the test fails to reveal a definite yellow color after the addition of one tube of calcium hypochlorite, another tube should be added and the water again tested.

In the application of this method the only point we have had occasion to criticize concerns the statement, "In the presence of free chlorine, a coloration is produced which ranges in shade from a light canary-yellow to a dark red, depending upon the amount of free chlorine present." We think there should be a specific statement concerning the coloration to be procured in order that we may have a positive indication of the amount of free chlorine present. A very small amount of chlorine will give a faint yellow color with the orthotolidine. In some of our work we have found that such small amounts will not bring about satisfactory sterilization within thirty minutes. With subsequent dechlorination, excessive dosing of the water is permissible in order to assure positive results under all conditions.

It is our belief, especially on account of the necessarily brief treat-

ment period, that the amount of free chlorine in the treated water, after the impurities have been satisfied, should be between 1 and 2 p.p.m. We have found that such amounts of chlorine give very definite and easily recognized colors with orthotolidine in the ordnance cup. The standard solution of orthotolidine for chlorine titration is 0.1 per cent in 10 per cent hydrochloric acid. An ordnance cup nearly full contains approximately 600 c.c.

In studying the progression of changes in color from a light canary-yellow with very small amounts of chlorine, through lemon, orange and up to red with relatively large amounts, it has been noted that there is a direct relation between the amount of orthotolidine added and the point at which the color changes from lemon to orange. Within limits, the smaller the amount of orthotolidine the deeper is the color developed with the same concentration of chlorine. The change from a definite lemon color to a definite orange color takes place within surprisingly narrow limits, and with 0.75 c.c. of standard orthotolidine solution the threshold is close to 1 p.p.m. With the orthotolidine constant in amount and the volume of water in the ordnance cup approximately 600 c.c., titration of the chlorine about the point which we consider necessary to effect satisfactory sterilization is therefore an exceedingly simple matter. No color standards are required. It is sufficient merely to be able to distinguish between lemon yellow and orange red. If after the addition of one tube of hypochlorite a trial titration shows a lemon-yellow color, more chlorine is needed in the water and another tube of hypochlorite should be added—and further addition continued until the titration shows a distinct orange or an orange-red color. If there is any doubt as to whether or not the color is orange and not lemon, the decision should be made on the side of safety and more chlorine should be added to the water.

We have attempted to make the directions for the treatment of water in the Lyster bag as simple as possible in order that men of relatively little training might do the work. These directions are as follows:

1. Set up the bag, adjust the cover and strain in the water to within about 4 inches of the top.
2. Get a clean stick or something of the kind for stirring the water. Place it down in the water and let it stay; do not take it out at any time.
3. The treatment of the water consists of adding the contents of tubes of calcium hypochlorite (lumpy powder in brown glass tubes), testing the water in an ordnance cup with orthotolidine (0.1 per cent solution in 10 per cent hydrochloric acid) which is a liquid contained in vaccine ampules, then, when the right color is obtained, waiting

thirty minutes and adding sodium thiosulphate to remove the excess of chlorine and destroy its odor and taste.

4. The method is as follows; carry out each step carefully:

a. Fill an ordnance cup about half full with water from the bag.

b. Take one of the brown glass tubes of calcium hypochlorite, break it while holding it over the cup, and dump its contents into the cup. Stir the powder into the water with a spoon and pour the water from the cup into the bag.

c. Stir the water in the bag thoroughly, then run three cupfuls through one of the faucets and pour the water back into the bag.

d. Draw off a cupful of the water through the same faucet. Fill the cup to within half an inch of the top.

e. Break the tip off one of the ampules of orthotolidine and shake the fluid into the cup of water. (This is a clear fluid in a tube such as those used for typhoid vaccine.) Stir this up in the water using another clean, dry spoon.

f. As the water is stirred it begins to turn yellow. This yellow color tells by its intensity whether or not enough tubes of calcium hypochlorite have been added. One may be enough, but it may take two or three or even ten or more. It is necessary then to add one at a time, testing in between, until the yellow color deepens quickly to a distinct orange or orange-red color. A lemon or canary-yellow means less than enough, and another tube must be stirred up in a cup of water and added to the bag as before.

g. If the color is lemon-yellow, fill another cup half full of the water, break another tube of calcium hypochlorite into it, stir it up and pour it into the bag. Stir the water in the bag, wash out one of the faucets three times, then fill the cup and shake into it the contents of an ampule of orthotolidine. Stir with a clean, dry spoon as before and look for an orange or orange-red color. If the color is again, at the end of about a minute, only a lemon-yellow, put in another tube of calcium hypochlorite and keep doing this until the test no longer shows a lemon-yellow but gives an orange or orange-red.

h. When the orange or orange-red color comes up, enough calcium hypochlorite has been added and the water will be ready to drink in thirty minutes. Take the time and prepare the solution which removes the excess of chlorine—the chlorine gives the water its peculiar odor and taste—from the water.

i. This neutralizing material is sodium thiosulphate, and it is supplied as crystals in clear glass-sealed tubes. Fill an ordnance cup with water, break one tube and shake the crystals into the cup. Stir with a spoon to dissolve and let this cup stand until the thirty minutes are up.

k. At the end of about twenty or twenty-five minutes begin washing out the faucets. Run 5 cupfuls of water through each and pour the water back into the bag.

l. At the end of thirty minutes pour the dissolved sodium thiosulphate into the bag and stir the water thoroughly.

m. The water is now ready for drinking.

We have used this technique many times in the laboratory for the treatment of water in the Lyster bag and have never yet failed to destroy all members of the colon-aerogenes group of bacteria in even heavily polluted raw river water.

Objection will be made by many of those who have had field experience that any procedure for the treatment of water requiring the addition of more than a single substance is too complicated and will not be followed under ordinary field conditions. In answer to this objection I am inclined to ask: Do we know what might be accomplished if we begin to consider the treatment of water a very serious function? I am still to be convinced that this method of treating water in the Lyster bag is necessarily too complicated, except under very unusual circumstances.

Iodine has been used to a considerable extent for the emergency treatment of drinking water, but its value is apparently not so well known as it deserves to be (3).

The standard tincture contains 7 per cent of iodine, and 5 c.c. of this in a Lyster bagful of water will render even raw Potomac River water safe for drinking after a delay of about thirty minutes. This is approximately equivalent to one drop in a quart, and means that the soldier—or traveler or tourist—may render polluted water safe for drinking if he adds one drop of tincture of iodine to a canteen or a 1-quart thermos bottle full of water. There are two possible objections to the use of iodine: The first is that in the case of persons with hyperthyroidism iodine may cause unpleasant symptoms, but persons with this condition should not be attempting to do field duty. The second is that we are unable to titrate the water for excess of iodine in the case of a heavily polluted source. This might be a serious objection, but the amount suggested is probably sufficiently in excess to take care of any but excessively polluted water. Its expense compared with chlorine makes it only an emergency substitute, so that when it becomes necessary to call upon iodine these objections carry relatively little weight.

In the Lyster bag, the excess of iodine may be removed, just as in the case of chlorine, by the addition of 1 gram of sodium thiosulphate.

Upon the supply table of the Medical Department of the United States Army are two sources of iodine in addition to the tincture. These are "Iodine Swabs," the tubes of which contain  $1\frac{1}{2}$  c.c. of  $3\frac{1}{2}$  per cent solution of iodine, and "Iodine—Potassium Iodide" in dry form in sealed tubes for making 50 c.c. of a 2 per cent solution of iodine. It is obvious that 10 c.c. of the "swab" solution or  $17\frac{1}{2}$  c.c. of the 2

per cent solution would be equivalent to 5 c.c. of standard tincture. By actual tests the efficiency of all these solutions has been demonstrated.

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# PREVENTIVE MEDICINE AND ITS RELATION TO MILITARY MEDICINE<sup>1</sup>

BY LIEUT. COMMANDER R. F. JONES

*Medical Corps, United States Navy*

THE personnel, as well as the matériel, of an army or a navy must be maintained in the highest state of efficiency in time of peace as well as in time of war, if such organizations are to give a good account of themselves when an emergency arises. The matériel, other than that under the cognizance of the Medical Department, and the fighting qualities of the men are under the supervision of officers of other corps, but the Medical Corps is held largely responsible for the physical fitness of the personnel. Quite true, line and other staff officers must also shoulder this burden, and properly so, as it is impossible to maintain health in either civilian communities or military organizations unless all cooperate to the fullest extent.

The manufacture and the maintenance of the material things of war is quite simple when compared with the development and maintenance of the personnel of armies and navies. For instance, the battleship, which is composed of the most intricate machinery, some of which is as highly adjusted as a watch, may be built and made ready for war purposes within two years, whereas it takes from eighteen to twenty years to develop the man before enlistment and from six months to a year after enlistment. A little attention each day to the most complicated machine in a battleship will keep this inanimate object in excellent condition; on the other hand, the human machine who uses the implements of war must receive constant attention throughout each day of life. This is usually done by the man himself, but experience has shown that if left to the man he will neglect his own mechanism. Therefore, we, as medical officers, must teach and train him how to give the proper attention to his body, the most delicate and intricate of all machinery. The medical officer has a much more responsible position than most of us assume; keeping men healthy, stalwart, and in the fullest physical vigor requires us to consider the individual person, groups of persons and his or their environment; all of which lead us in devious pathways and byways of life, little understood by the greatest philosophers.

In so far as military medicine is concerned, the art and science of medicine should be considered as the study of health, how health is impaired, how to prevent impairment of health, and how to restore a

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<sup>1</sup>Read at the 30th Annual Meeting of The Association of Military Surgeons of the U. S., Washington, D. C., October 12-14, 1922.

diseased person to a healthy condition. In other words, the art and science of medicine is to us the practice of preventive medicine, diagnostics, and therapeutics; and preventive medicine should be practiced to a greater extent than any of the others, the others being considered as adjunct to preventive medicine.

In order to determine the importance of preventive medicine to military medicine I submitted the following questions to a dozen or more prominent officers of the Navy, line and staff:

1. What percentage of the medical corps' energies should be devoted to preventive medicine?
2. What percentage to military duties?
3. What percentage to purely clinical medicine, including diagnostics and therapeutics?

The average of the answers to these questions was approximately 70 per cent to preventive medicine, 8 per cent to military duties, and 22 per cent to purely clinical medicine.

The relation of preventive medicine to military medicine may be more clearly understood by an analysis of the objects of military medicine, which, in my opinion, are as follows:

1. To develop and fortify the physique of the individual, man and officer, and thus to increase the capacity and the powers of resistance of the individual and the command, thereby permitting the man and the command to withstand the hardships of war.

It is not only necessary for a sailor or soldier to be normal in body and mind but he must have sufficient strength and endurance to undergo, without breaking, the tremendous strains, both to mind and body, to which he is subjected in time of war, or, for that matter, frequently in time of peace. All unnecessary losses of manpower must be avoided, for it should be constantly held in mind that the loss of a single man weakens the turret team, a platoon, or any other unit of a navy or an army. Military men are agreed today that it is essential to reduce such losses to a minimum. The first step in preventing such unnecessary losses is to induct into service men who are physically and mentally sound.

Unquestionably the selection of recruits for an army or navy is one of the most potent preventive measures, in the hands of the medical officer, for the protection of the services against high morbidity and mortality rates which may occur from diseases and injuries other than casualties in action. The medical officer on recruiting duty must not only know health and pathological conditions affecting the human body but he must have a knowledge of the military duties to which the men are to be subjected. For example, it is not necessary for a

man who is to perform a yeoman's duty to have as good a physique as a fireman, but this yeoman must have the physical qualifications to perform other duties in an emergency without breaking at the time he is most needed.

Since the average civilian accepted at recruiting stations has not the physical development to withstand active military service, it is necessary that these men be sent to certain training centers in order to build up their physique before they are distributed among seasoned men. Furthermore, few men in civil life realize the importance of caring for their personal health or the health of their associates. At the training stations we endeavor to teach the men personal hygiene, how to care for their clothing, etc. They are protected against smallpox and typhoid fever, and by building up their physique we attempt to protect them against other diseases, for it is well known that fatigue plays a large part in the susceptibility of the individual to disease.

The development and the maintenance of the physique of the man must not stop at the training station; it must continue throughout his service life. The line officer today realizes that physical training is as essential as training in arms. Consequently a considerable portion of the time of a soldier or a sailor is spent in physical exercises; in fact, practically all duties, such as drilling, etc., take into consideration the physical development of the man. Another important measure in the hands of the medical officers looking toward the prevention of disease in the individual and the command is the constant surveillance of each man and officer in his unit. The medical officer must inspect them at regular intervals and must advise them in matters regarding their health. Far-sighted commanders know how much depends on the feeding, clothing, and maintenance of the physique and morale of their men, and the vast majority will now take sensible recommendations from non-combatants whereas a few years ago they would have paid little attention to them.

2. To prevent or remove the causes or conditions of disease or of its propagation; this not only to be done in military commands but in civilian communities where it may affect military operations.

To fulfill this obligation the medical officer must be the public health officer of the command and therefore must know preventive medicine and its associated sciences which includes hygiene, sanitation, epidemiology, prevention and control of disease, diagnostic medicine, immunology, vital statistics, etc., in fact, everything concerning man and his environment, which will promote health and prevent disease.

Preventive medicine is too often interpreted to mean the prevention and control of communicable diseases. In its broader sense it deals

with the prevention or the removal of the causes or conditions of any disease or of its propagation. The statistics of the Navy show that in the past five years 33.47 per cent of the admissions for all causes and 30.04 per cent of sick days were due to communicable diseases, such as measles, mumps, scarlet fever, meningitis, diphtheria, tuberculosis, etc. Of the remaining 66.53 per cent, 13.60 per cent were due to the venereal diseases, 8.19 per cent to injuries, and 44.74 per cent to all other causes. Tonsillitis and the various respiratory diseases, not generally classed as communicable, caused practically as much damage as all other communicable diseases, exclusive of the venereal diseases. Medical officers treat these diseases lightly and make no concerted effort to prevent or control their spread. Chronic diseases which are insidious in their onset may possibly be controlled if detected in their incipency. This may be done by educating the personnel as to the cause and prevention of such conditions.

Although a great deal has been accomplished in the prevention and control of the so-called environmental diseases, much remains to be done in the prevention and control of diseases transmitted by contact infection. Medico-military specialists such as Ross, Reed, Gorgas, Lind, and many others, in their discoveries in the control of environmental diseases and food deficiency diseases, stand out in history as great benefactors to the human race. Is it too much to expect medico-military men to again come forth with discoveries in the prevention and control of contact infections?

3. To so function with the fighting forces that men are kept in their places in battle.

One of the chief concerns of the commander of military forces in time of war is to keep as many men at as many guns as many days as possible. Without organization this is impossible. Any organization must include all departments of the military forces, combatant and non-combatant, inasmuch as each is dependent upon the other. The medical department, in order to function properly with the various other departments of the military organization, must have its officers trained in the military profession as well as in medicine, for unless they have some understanding of tactics, strategy, etc., it will be impossible for them to carry out their function in time of war. The medical department's activities as well as the activities of all other departments should be along lines which will promote the greatest efficiency of the army or navy. This cannot be accomplished unless there is complete cooperation.

In what way may the medical corps best function with the remainder of the Army or Navy?

(a) By practicing preventive medicine throughout the military organization, never ceasing to use every practical means known to build up the physique of the men and prevent disease occurring among them.

(b) By making only such recommendations to the military commanders which will be of advantage in the movements of the troops, no recommendations which will interfere in any way with military tactics should ever be made.

(c) By raising the morale of troops by promoting their health and comfort, and by giving them proper medical attention and treatment.

(d) By preventing shirkers or malingerers from leaving the line of battle and by sending all slightly injured back to duty immediately.

(e) By removing the injured or diseased from the fighting area as rapidly as possible and with the least interference with the combatant forces and the train of supplies; this should be done without calling on the combatant forces any more than is absolutely necessary.

4. To return diseased and injured men to duty as soon as practicable.

Even during peace, should the Navy be fully manned, it would be necessary to employ approximately 3 per cent more men than are actually needed to man its ships and shore stations, because of the fact that past experience has shown that an average of 3 men out of every 100 will be on the sick list each day during the year. In other words, the Navy is not only encumbered with a certain number of men, but, which is of far greater importance, these are absent from their places in battle.

It is well known that manpower will decide the fate of an army or navy, if all other things are equal. Therefore, the more active, healthy men in line of battle, and held in reserve for battle, the greater the opportunity for winning. Do medical officers always grasp this fact and do they always return men who are on the sick list to duty as soon as practicable? In studying over the hospital statistics of the Navy I have been impressed by the length of time that some men are kept on sick report in hospitals. The medical officer who retains men of the combatant forces in a hospital longer than it is absolutely necessary is not cooperating to the fullest extent with the military commanders and is, in a small way, a detriment to the military forces rather than an assistant. Looking at it from another angle, the medical officer should realize that a man returned to his unit raises the morale of the troops to a tremendous extent, for the uninjured men then know that this man who fell in battle has been properly cared for.

5. To salvage men maimed as a result of service conditions and of the horrors of war.

The specialist in military medicine is not called upon in the salvaging of men maimed in war to the extent that he is in the practice of preventive medicine, for competent surgeons and other specialists may be easily inducted into service during war to care for such cases. However, it is necessary for medico-military men to know what should be done and how it should be done, for he will be in command of the hospitals or acting in the capacity of executive officer and must therefore have sufficient knowledge to know whether his assistants are competent to treat such cases or not. In time of peace it is necessary for the military establishments to have a certain number of specialists in surgery and other specialties in order to properly care for our own cases, for it is not always practicable or desirable at that time to obtain the assistance of the civilian specialist.

But, after all is said and done, all of our work in clinical medicine should be with the idea of restoring men to duty. Where it is found that a patient will not be restored to duty in a reasonable time, it is far more economical to discharge that man from the service and recruit another in his place. If this attitude is taken, it becomes clearly evident that the military services in time of peace need only a few highly trained clinical specialists. The services do need, however, medical officers thoroughly versed in the art and science of medicine, and each one of them should be specialized in military medicine.

In conclusion, I wish to quote from an article by Sir William J. Polk, in the *Chemical Age*, London, May, 1921, which shows in a few words what relation preventive medicine has to military organizations.

Every great soldier has realized that an army is limited in size by the difficulty of keeping it free from epidemics and communicable diseases; previously this factor pinned the army dimensions down to a unit of 100,000 men. When the resources of preventive medicine were properly applied the unit dimensions became 1,000,000 men. Preventive medicine made it possible to maintain 20,000,000 men under arms and abnormally free from disease (during the World War).



## ASSOCIATION NOTES

### PROCEEDINGS OF THE THIRTIETH ANNUAL MEETING OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES, WASHINGTON, D. C., OCTOBER 12-14, 1922

#### MINUTES OF THE MEETING

The Thirtieth Annual Meeting of The Association of Military Surgeons of the United States convened at Washington, D. C., October 12, with Capt. Frank L. Pleadwell, M. C., U. S. Navy, presiding. The meeting was opened by an invocation by Capt. E. W. Scott, Chaplain, U. S. Navy. The following letter from the Honorable Edwin Denby, Secretary of the Navy, who was to have addressed the meeting, was read by the president, Captain Pleadwell:

NAVY DEPARTMENT, WASHINGTON,  
*October 10, 1922.*

MY DEAR CAPTAIN:

I regret exceedingly that urgent matters necessitate my absence from Washington on the date of the opening of the first session of the Association of Military Surgeons on October 12, and that I shall have to withdraw the acceptance of your kind invitation to appear before the association. I am the more disappointed that I shall not have the pleasure of appearing because of the very pleasant acquaintance I made with the members of the association at the Detroit meeting in 1905, when I had the honor of making an address.

Will you please convey to the distinguished guests from other countries an expression of welcome from me and to the members of the association my cordial well wishes for an entirely successful meeting.

With best wishes, I remain,

Sincerely yours,

EDWIN DENBY,  
*Secretary of the Navy.*

The president then introduced Maj. Gen. Merritt W. Ireland, Surgeon General, U. S. Army, who addressed the meeting as follows:

Mr. President and Members of the Association, I think it eminently fitting that the annual meeting of the Military Surgeons of the United States should occasionally be held here at the seat of government, where all the laws and policies concerning national defense and the promotion of international comity, subjects in which our association is intensely interested, are laid down.

To the sentiments of friendly greeting already expressed permit me, as a representative of and in behalf of the Army, to add a most cordial welcome to Washington.

As spokesman for the Medical Department I particularly desire to

express to those delegates from foreign shores who have come so far to participate in the proceedings of this convention our appreciation of their attendance.

An international exchange of ideas among medical men accrues to the benefit of humanity everywhere, and will have far-reaching effects in mitigating the horrors of future wars. In keeping with our great mission of mercy new discoveries by our profession are not to be concealed or exploited, but must be given world-wide publicity, without thought of personal gain or national aspirations. For in the healing art we recognize neither east, west, nor nationality.

Many of you in conference here today are citizen soldiers affiliated either with the National Guard or the Organized Reserves. With no little pride can you point to the fact that members of this association were the pioneers in the development of the Reserve Corps idea in this country, and today are witnessing the evolution of a dream far exceeding the expectations that were awakened when in 1908 provision for a Medical Reserve Corps was first written into the statutes.

As an association we should now put forth our best efforts to promote the military policy of the country by extending a helping hand in perfecting the harmonious organization of the three component parts of the Army of the United States—the Regular Army, the National Guard, and the Organized Reserves.

Among the various army activities in Washington I am sure that you will find some of more than passing interest. The doors of the Walter Reed General Hospital, the Army Medical School, the Army Medical Museum and the Army Medical Library are open to you. I hope that those among you who have not previously had the opportunity will find time to visit these institutions during your brief sojourn here. I can assure you of a most hearty reception.

Following General Ireland's address, Rear Admiral E. R. Stitt, Surgeon General, U. S. Navy, was introduced and addressed the meeting as follows:

Mr. President, Guests and Members of the Association, in looking into the matter of what might be the scope of the specialty, if you can so designate it, of a military surgeon, it occurred to me that it would be well to read some of the papers of the earlier numbers of *THE MILITARY SURGEON*, as well as papers covering the period of the last few years, in order that I might gain an idea as to the development of military medicine and surgery. In the earlier numbers I found that a majority of the papers dealt with subjects that might be considered as public health problems, and in the later numbers of *THE MILITARY SURGEON* this interest in public health matters continued. This can readily be understood when we consider that the first essential for a military surgeon is to be a public health officer, whether as post surgeon at some isolated army post, where he has no one to consult in public health matters, or as the medical officer on board a ship, cruising alone, who has only himself to turn to when such problems arise.

I attended the meetings of the sanitarians called by General Cumming in March of the present year, and at that meeting, as you remember,



were gathered all the leading college presidents and medical sanitarians of this country. It was very interesting to learn of their views as to the type of education that should be given when taking up public health work. There seemed to be a general opinion that a man should have a college education, in which particular emphasis was given to chemistry, physics, biology, psychology, etc. In the course at a medical college particular attention was to be given such scientific subjects as bacteriology, general pathology and epidemiology, and he should later on acquire experience in sanitary engineering, vital statistics and in public health administration. I remember that Dr. Stiles stated that an important qualification was that he have a spirit of personal sacrifice. I think that military surgeons qualify in this way. Dr. McCormack thought the public health officer should have the spirit of service so well typified in the old country doctor. Dr. Ravel was going to have him a man of good sense who could put any knowledge into effect. Others felt he should be an administrator and one able to influence public opinion and legislative bodies.

Now I think that all will admit that the military surgeon has to be a public health officer, and if he has the qualifications that are considered necessary for a public health officer to have, as brought out at that meeting, he is a superior product of our medical education. In addition, the military surgeon must be able to perform emergency operations, whether at the isolated post or on the battlefield. He must have some knowledge of the specialties of the eye, ear, nose and throat. He must be his own psychiatrist and his own laboratory man, but along with these he must be a general practitioner in the best sense of the word.

Since the Great War he must have a broad view of the medical aspects of aviation. He must have an idea of what gas warfare means, not necessarily the chemistry of gas warfare, but the methods of protecting against the effects of gas. He must have some idea of the hygiene of submarines, and in the Navy, on account of the great industrial plants in our navy yards, he must make a study of the problems of industrial hygiene. So that, with public health attainments, a certain degree of specialization along many lines, and in addition to be a good general practitioner, makes the training of a military surgeon a difficult one. The more I read of what the military surgeon should be, the greater becomes my respect for the man who conscientiously tries to do his best along the various lines just indicated.

Captain Pleadwell stated that Surgeon General Hugh L. Cumming of the United States Public Health Service had asked him to express his regrets at his being unable to be present and address the meeting, owing to his being obliged to go abroad on official duties.

The president, Capt. Frank L. Pleadwell, M. C., U. S. Navy, then addressed the meeting. His address appears elsewhere in this issue.

The following named delegates from foreign countries were next presented for election to Honorary Membership in the association as recommended by the Executive Council, and upon motion, duly seconded, they were declared so elected.

These gentlemen were called before the association, and Dr. Horace M. Brown addressed them as follows and invested them with the badge of the association in token of their election to membership:

*Surgeon Rear Admiral C. M. Beadnell, Royal British Navy.*

Representing a sister service from a mother country, wise in the experience gained from the duties involving a soldier concerned in war; honored and trusted by the Government which delegates you to us, a foreign if not an alien nation, it is with the utmost pleasure, the most entire satisfaction that I am enabled by the vote of the Association of Military Surgeons of the United States to present to you this, the visible token, of fellowship in our society.

*Colonel P. G. Goldsmith, C. B. E., C. A. M. C.*

From a territory so contiguous to ours that we may claim more than cousinship, a soldier versed in the arts of your profession, skilled in the varied and trying duties of nations at war, it gives me much personal satisfaction to welcome you, as has been my privilege with colleagues of your country in the past to membership in this, our society.

*Henri Rouvillois, Medicin Principal, Premier Classe, de l'armee Francais  
Professeur de l'application du Val-de-Grace, Paris.*

D'être nommé comme Professeur de l'hôpital Val-de-Grace, si bien connu dans toute le monde, c'est a dire que vous etes distingué comme médecin, et aussi comme médecin militaire. Nous sommes sensibles de l'honneur de votre presence ici, delegué par votre gouvernement, et il me fait beaucoup de plaisir de vous recevoir comme membre honoraire de notre association.

*Robert Picque, Medicin Principal, Deuxieme Classe, de l'armee Francaise,  
Professeur de la Faculte de medicine de Bordeaux.*

Nous sommes très reconnaissants de votre presence ici aujourd'hui comme representatif de la Service de Santé de l'armée française et c'est a moi un vrai plaisir de presenter a vous cette medaille, l'insigne de notre société.

*Major B. Tanabe, Medical Corps, Imperial Japanese Army.*

It gives me much pleasure, Major Tanabe, to welcome you to our meeting. Japan, in the person of Noguchi and many other keen scientists, has added much to our knowledge of medicine. We are honored by your presence with us and hope that you may not only profit by the professional side of our program but that you may carry from it a sense of personal friendship.

*Dr. Eudora Aguilar, Capitan de'l servicio de Sanidad, d'el ejercito Peru-  
viano.*

Senor, me hace mucho placer de darle a Vd. el bienvenido como delegado de la Republica de Peru a nuestro convention. Yo le aseguro a Vd. que nosotros somos sensibles de las relaciones non solamente profesionales, pero como vecinos, que deben existir entro vuestro país et los Estados Unidos. Me gusto mucho de presentar a Vd. esta medai-

alla comò testimonio de vuestro eleccion como miembro honorario de neustro sociedad.

*Comandante Neocle Ragusin, d'el ejercito de la Republica de Argentina.*

Senor, me gusto mucho de poner a su disposicion nuestro casa; nosotros somos en verdad honrados por la representacion de la Republica de Argentino. Está la verdad, quizas, que nosotros somos d'el mismo sangre, porque dice el mundo que los Argentinos son los "Yankees" d'el America del sud. Yo me estimo honrado, como secretario, de presentar a Vd. esta insigno de nuestra association en testimonio de vuestra eleccion como miembro honorario.

The chairman announced the findings of the Board of Award for the Wellcome prize Competition, the first prize going to Major Mahlon Ashford, M. C., U. S. Army, and Honorable Mention for the second prize to Major Ethian Flagg Butler, M. R. C., U. S. Army.

The report of the Necrology Committee was received standing, following which the secretary-treasurer read the following reports:

#### REPORT OF THE EXECUTIVE COUNCIL

During the period June 1, 1921, to October 12, 1922, there were twelve meetings of the Executive Council, as follows:

- July 1, 1921—meeting called by mail
- September 1, 1921—meeting called by mail
- October 1, 1921—meeting called by mail
- November 1, 1921—meeting called by mail
- December 1, 1921—meeting called by mail
- February 1, 1922—meeting called by mail
- March 8, 1922—meeting at the Army & Navy Club, Washington, D. C.
- May 1, 1922—meeting by mail
- July 1, 1922—meeting by mail
- August 18, 1922—meeting at the Army & Navy Club, Washington, D. C.
- September 28, 1922—meeting at the Army & Navy Club, Washington, D. C.
- October 11, 1922—meeting at the Army & Navy Club, Washington, D. C.

#### REPORT OF THE SECRETARY-TREASURER

*To the President and Members of The Association of Military Surgeons:*

I submit herewith a report of the activities of the office of secretary-treasurer for the period from May 16, 1921, to October 1, 1922. During the period covered by this report we have made every effort towards increasing the circulation of the journal. While the result of our efforts along this line has not been what we had hoped for, the work has been of benefit to the Association, 307 new members having been added to our roster since our last meeting. As previously stated, it is believed that if those who make up the Association would take into consideration

the fact that the personal element plays a large part in setting forth the advantages of membership, the increase would be much more rapid.

The Association, as well as every business corporation, has felt the influence of the post-war "slump," and during a period the matter of finances was a difficult one. Prices of printing, labor, or paper, and other commodities essential in the production of the journal were high, and on account of the general increase in living expenses and the consequent tendency for curtailment wherever possible, there was a falling off in subscribers and also in the number of our advertisers. It is believed that this crisis is past and that the Association should go forward *pari passu* with other enterprises more or less dependent on a business basis. It is hoped that our income from advertising for the coming calendar year will be in excess of the last, also that it may be possible to effect a reduction in the cost of the production of the journal.

As has been stated above, the matter of membership is one which should concern not only the secretary, but all those who already belong to the Association. One member, an officer in the Public Health Service, on his own initiative and without solicitation by the secretary, sent in some twenty odd names for membership. If his example were followed, even to a lesser degree, it is entirely evident to what strength our membership might be increased. Each year at the annual meeting I have made a prayerful plea along this line, and each year a wave of enthusiasm has spent itself within the three-day limit of our conference. I sincerely hope that some of those who are in attendance at this session may take this matter seriously and do a little boosting.

It seems quite fitting to call attention to a most excellent and scholarly piece of writing which has appeared in *THE MILITARY SURGEON* during '21 and '22. I refer to Lieut. Col. Garrison's series of articles entitled "Notes on the History of Military Medicine." These articles, as many of you are aware, give a concise résumé of military medical science from the earliest traditions down to the present time. In addition to the subject matter, Colonel Garrison has added an extensive series of footnotes and references which enable anyone interested in the study of this subject to specialize upon any particular phase. I have received a number of very flattering comments on this series of articles from those who have read them, and I am entirely confident that their publication has done much for the prestige of our magazine. As the members of the Association have already been informed, these papers have been collected and published under one cover; copies of them may be obtained on application to the Office of the Secretary. In regard to the general policy of *THE MILITARY SURGEON* there is only one point which I desire to touch on. At the time I took up the editorial duties, I found that it had been customary to publish from four to five original articles, all rather long. It seemed to me more rational to cut down the length of the articles and to publish a greater number with a greater variety, therefore making it practically certain that in each issue there would be something of interest to each reader of the journal.

The following is a statement of the financial affairs of the Association for the period covered by this report:

RECEIPTS

Admission Fees.....	\$1,782.65
Annual Dues.....	13,577.30
Subscriptions.....	1,471.72
Advertising.....	7,035.62
Miscellaneous (including sale of reprints, insignia, etc.).....	*11,669.20
Total.....	\$35,536.49
Cash Balance May 16, 1921.....	1,138.07
Grand Total.....	\$36,674.56
Less Disbursements.....	36,150.22
Cash Balance October 1, 1922.....	\$524.34

DISBURSEMENTS

Printing Journal.....	\$21,371.92
Salaries.....	6,385.00
Cost of Reprints.....	2,255.78
Expense of Meeting at Boston.....	256.78
Postage.....	1,282.17
Miscellaneous (including telephone, cost of insignia, stationery, membership certificates, etc.).....	†4,598.57
Total.....	\$36,150.22

ASSETS OCTOBER 1, 1922

U. S. Bonds, Third Liberty 4¼ Converted.....	\$15,000.00
U. S. Bonds, Fourth Liberty 4¼.....	4,000.00
Deposit Union Trust Co.....	97.58
Deposit National Bank of Washington.....	524.34
Total.....	\$19,621.92

The chairman then appointed the following committees:

*Nominating Committee:*

Col. Frederick H. Vinup, M. C., Md. N. G.  
 Capt. Charles E. Riggs, M. C., U. S. Navy.  
 Col. J. F. Siler, M. C., U. S. Army.  
 Dr. Wm. C. Rucker, U. S. P. H. S.

*Auditing Committee:*

Capt. J. C. Pryor, M. C., U. S. Navy.  
 Lieut. Comdr. R. F. Jones, M. C., U. S. Navy.

*Committee on Resolutions:*

Capt. Chas. S. Butler, M. C., U. S. Navy.  
 Lieut. Col. Chas. R. Reynolds, M. C., U. S. Army.  
 Lieut. Comdr. Wm. M. Kerr, M. C., U. S. Navy.

The meeting then adjourned until 2.00 p. m.

At the second session, at 2.00 p. m., October 14, the following papers were read:

\* Includes \$1,000 withdrawn from Deposit Union Trust Co., sale of six \$1,000 Liberty Bonds, and \$500 Wellcome Prize Money.

† Includes payment of \$2,500 debt.

"The Relation of the U. S. Military and Public Health Service to Civil Practice," by Dr. A. W. Boswell, President, District of Columbia Medical Society. This paper was discussed by Dr. Horace M. Brown and Capt. D. N. Carpenter, M. C., U. S. N.

"Some Notes on the Management of the Common Complaints of the Ear, Nose and Throat in the Troops on Active Service, with a Consideration of the Relationship which should exist between the Specialist and the Medical Officer," by Col. P. G. Goldsmith, C. A. M. C., C. B. E. This paper was discussed by: Comdr. Rossiter, M. C., U. S. N., Capt. Pleadwell, M. C., U. S. N.; Lieut. Comdr. Kerr, M. C., U. S. N.; Major Corbusier, M. C., U. S. A.; Comdr. Bainbridge, M. C., U. S. N. R. F.; Captain Riggs, M. C., U. S. N., and Dr. Reed, M. C., U. S. N.

Capt. D. N. Carpenter, M. C., U. S. N., then read a paper entitled "The Military Surgeon as a Specialist," which was followed by a paper on "Medical Aspects of Naval Gas Warfare," by Lieut. Gilbert H. Mankin, M. C., U. S. N. Dr. Mankin's paper was discussed by Colonel Church, U. S. A., Retd., and Captain Carpenter, M. C., U. S. N.

The meeting then adjourned until 8.30 p. m.

At the third session, 9 p. m., the following literary program was then given:

"The Brigade Surgeon with a Tropical Expeditionary Force," by Comdr. John J. Snyder, M. C., U. S. N., was read by title. Surgeon Edward Francis, U. S. P. H. S., then addressed the meeting on the subject of "Tularaemia," following which a paper entitled "The Immunity Conferred by Smallpox Vaccination," by Surgeon J. P. Leake, U. S. P. H. S., was read. Dr. Leake's paper was discussed by Captain Riggs, M. C., U. S. N.; Captain Pleadwell, M. C., U. S. N.; Colonel Ashburn, M. C., U. S. A.; Colonel Siler, M. C., U. S. A., and Major Tasker, M. C., U. S. A. Lieut. Comdr. R. F. Jones, M. C., U. S. N., then addressed the meeting on the subject of "Preventive Medicine and Its Relation to Medical Military Problems." This paper was discussed by Colonel Siler, M. C., U. S. A., and Colonel Church, U. S. A., Retd. The last paper of the evening was read by Major Milton W. Hall, M. C., U. S. A., on the subject of "Some General Considerations Regarding the Etiology of the Respiratory Infections."

The fourth session at 9.30 a. m., October 13, was held at the Naval Medical School. The following papers were read at this session:

"Some Salient Features of the Pharmacology of Arsphenamine with Reference to its Clinical Usage," by Prof. Carl Voegtlin.  
"Neurosyphilis," by Lieut. Comdr. R. F. Sheehan, M. C., U. S. N., Retd.

"Labyrinthine Reactions in Syphilis," by Major Wm. F. Bonner, M. R. C., U. S. A.

"An Hypothesis for Public Health Among Peoples Practically Aboriginal," by Lieut. Comdr. W. E. Eaton, M. C., U. S. N.,

Dr. Eaton's paper was discussed by Dr. Wm. C. Rucker, U. S. P.H.S.

A paper by Capt. C. N. Fiske, M. C., U. S. N., entitled "Naval Enlisted Personnel Selection," was read by title, after which the meeting adjourned in order that the members might visit the Naval Medical School and Hospital, as well as the Hygienic Laboratory.

The fifth session met at 2.00 p. m., and the following papers were presented:

"Some Changes in the Duties and Activities of Naval Medical Officers Afloat," by Capt. Charles E. Riggs, M. C., U. S. N., Fleet Surgeon, Atlantic Fleet. This paper was discussed by: Lieut. Commander Higgins, M. C., U. S. N.; Lieut. Commander Jones, M. C., U. S. N.; Col. P. C. Hutton, M. C., U. S. A.; Capt. F. L. Pleadwell, M. C., U. S. N.; Col. P. M. Ashburn, M. C., U. S. A., and Capt. C. S. Butler, M. C., U. S. N.

"The Emergency Treatment of Water for Drinking Purposes," by Major A. Parker Hitchens, M. C., U. S. A.

A paper entitled "The Fleet Surgeon; Some Thoughts on His Official Relationship and Opportunities for Useful Service," by Capt. W. H. Bell, M. C., U. S. N., Fleet Surgeon, Pacific Fleet, owing to the absence of Captain Bell was read by title.

Major B. Tanabe, M. C., Imperial Japanese Army, then presented a paper entitled:

- I. "Determination of the Specific Preventive Immune Bodies Produced in the Blood as a Result of Preventive Typhoid and Paratyphoid-B Inoculation." II. "Notes on the Relation between Preventive Inoculation and Status Lymphaticus."

The reports of the various committees appointed at the first session were next received. The Nominating Committee submitted the following list of nominations: For President, Col. Charles Lynch, M. C., U. S. A.; First Vice-President, Col. Gilbert E. Seaman, M. C., Wisc. N. G.; Second Vice-President, Sr. Surg. J. C. Perry, U. S. P. H. S.; Third Vice-President, Rear Admiral E. R. Stitt, M. C., U. S. N.; Member Sinking Fund Committee, Capt. Frank L. Pleadwell, M. C., U. S. N. Upon motion, duly seconded, that the Secretary cast the unanimous ballot for these nominees was carried.

The following resolutions were next adopted:

Whereas, a bill known as H. R. 12605, which, if enacted into law,

makes it "unlawful for any officer, enlisted man, or civilian employee of the Army or the Navy, in the pursuit of any research, investigation, or test of the efficacy of any gas, liquid, powder, or other noxious substance, to employ the same upon the living body or tissue of any domestic animal," has been introduced into the House of Representatives, by Mr. Johnson, a member of Congress, from the State of Washington, and which, if it becomes a law, would seriously interfere with experimental research into the nature of disease and the treatment of disease, and which is unanimously opposed by the great scientific and medical associations of this country who recognize in it a blow to the freedom of vivisection and to the advancement of medicine and biology;

Whereas, this bill, if enacted into law, will place the scientific investigators along all lines of medicine and the allied sciences at a great disadvantage when compared with the scientists of other countries not thus handicapped;

Whereas, this bill strikes at the very root of the matter of National Defense and self-preservation; therefore, be it

*Resolved*, that the Association of Military Surgeons, now convened in the City of Washington, records its conviction that experiments on living animals have proved of the utmost service to medicine in the past, and therefore civilization, and are indispensable to future progress. Be it further

*Resolved*, that the Association of Military Surgeons is unanimously opposed to the passage of H. R. 12605, and that a copy of these resolutions be furnished the Military Committee of the Senate of the United States and House of Representatives.

C. S. BUTLER,  
WILLIAM M. KERR,  
C. R. REYNOLDS.

*Resolved*, That the Association of Military Surgeons of the United States assembled at Washington, D. C., October 12 to 14, 1922, hereby expresses sincere regret at the loss of two of its most prominent members, Commodore John Cropper Wise, Medical Corps, United States Navy, and Captain George Augustus Lung, Medical Corps, United States Navy. The former served as president of the Association from 1903 to 1904 and the latter from 1917 to 1918. Both interested themselves in the affairs of the Association for many years and both played a prominent part in advancing the interests of the Association.

C. S. BUTLER,  
WILLIAM M. KERR.

The following papers were then presented:

"Medical Problems of Aviation," by Lieut. Col. Wm. R. Davis, M. C., U. S. A.

"Aviation Problems in the Navy," by Lieut. Victor S. Armstrong, M. C., U. S. N. (read by title).

"The Selection of Naval Aviation Personnel," by Lieut. Page O. Northington, M. C., U. S. N. Lieutenant Northington's paper was discussed by Lieutenant Neuberger, M. C., U. S. N.



The session closed with a demonstration by Major John P. Fletcher, M. C., U. S. A., showing the proposed new standardized field carry device for the individual equipment of the medical department of the army.

At the sixth session at 9.00 p. m., the following papers were read:

"A Plea for Closer Relationship between Medicine and Pharmacy," by Commander R. C. Holcomb, N. C., U. S. N. Dr. Holcomb's paper was discussed by Dr. Horace M. Brown.

"Medicine in the Revolt of the XVIth Century," by Dr. Horace M. Brown.

"The Importance of Correct Diagnosis," by Lieut. Comdr. John J. O'Malley, M. C., U. S. N. (read by title).

"The Use of Automatic Absorbable Metallic Sutures and Ligatures," by Lieut. Comdr. Joaquin Sanchez Gomez, M. C., Imperial Spanish Navy.

"A Brief Summary of the Congres International de Medecine et de Pharmacie Militaires," by Comdr. Wm. Seaman Bainbridge, M. C., U. S. N. R. F. Commander Bainbridge's paper was illustrated by an official film of three reels taken by the Belgium Government.

The session closed with the showing of a film by Col. Henri Rouvillois, Medical Corps, French Army, depicting the activities of the French Medical Corps during the world war.

The final session was held at Walter Reed General Hospital, 9.30 a. m., October 14. An address and clinic by Col. Wm. L. Keller, M. C., U. S. A., on the "Treatment of Chronic Empyema," was followed by an address and clinic on "Bone Graft Surgery," by Lieut. Col. Norman T. Kirk, M. C., U. S. A. Lieut. Comdr. W. A. Bloedorn, M. C., U. S. N., then read a paper on "Broncho-Pneumonia with Special Reference to Incidence and Diagnosis."

The newly elected officers of the Association were then installed, and after a short visit to the various departments at Walter Reed General Hospital, the members witnessed a demonstration by the Chemical Warfare Service.



## BOOK REVIEWS

THE NEWER KNOWLEDGE OF NUTRITION: The Use of Food for the Preservation of Vitality and Health, by E. V. McCollum, Ph.D., Sc.D., Professor of Chemical Hygiene in the School of Hygiene and Public Health of the Johns Hopkins University, Baltimore, Md. 8°, 2d edition, entirely rewritten, 449 pp., illustrated. New York: The Macmillan Company, 1922.

Vitamines! In one magic word there is summed up essentially all of present-day knowledge regarding nutrition. In the consideration of any article of subsistence one now asks not whether it is of the proteins, fats, or carbohydrates (the "Proximate Principles," good old friends of our student days) but which vitamine it supplies and what is its content thereof. Vitamines are not really new, for some twelve or fifteen years ago Funk had ascribed certain "deficiency" diseases (beriberi, scurvy, pellagra and rickets) to the dietary lack of certain elements which he named "vitamines" at least as early as 1910. Even before the beginning of the present century experimental beriberi (polyneuritis gallinarum) had been produced in fowls by Professor Eijkman (to whom Dr. McCollum gives the credit of having first produced experimentally a disease of dietary origin) by restricting them to a diet that consisted solely of highly polished rice. These early experiments, however, did not seem to lead on the part of the investigators to exactly the same conception of the etiology of beriberi as that of the absence of some *specific* chemical component in the diet which was later propounded by Funk. Not only does the credit for the general conception of "vitamines" belong to Funk, but he likewise seems to have been the first to recognize the multiplicity of these substances and their specificity in the prevention of the definite diseases above referred to.

The scientific knowledge of the whole general subject of nutrition, and more especially of the knowledge of vitamins, has advanced at a tremendous pace within the last few years. Perhaps nothing better illustrates the rapidity of this progress than the fact that, in 1918, there appeared from the pen of Dr. E. V. McCollum a little book of less than 200 pages entitled "The Newer Knowledge of Nutrition," and that in 1922 Dr. McCollum gives to the scientific world the so-called "Second Edition, entirely rewritten" which is a volume of 450 pages, considerably longer and wider, and printed in much smaller type than the original edition. The qualifying phrase, "entirely rewritten," is well taken, for while here and there—especially in the introductory chapters—may be found sentences which are partly identical or recognizably similar in the two "editions," for the most part the later publication is an entirely new work. Perhaps the most important reason for referring to the present volume as a second edition of the earlier one, in addition to the fact that both deal with advances along the same general lines, is the original choice by the author of a very apt and impressive title upon which it would have been hard to improve and which, therefore, he doubtless hated to give up.

The book is divided into eighteen chapters of which the individual titles are as follows: "The Beginning of a New Era of Nutrition Studies," "A Biological Method for the Analysis of a Food-stuff," "Earlier Views on Nutrition Problems," "The Nutritive Value of the Proteins from Various Sources," "Peculiarities of Composition of Proteins from Various Sources," "The Dietary Properties of Individual Food-stuffs," "The Vegetarian Diet," "The Dietary Deficiency Diseases, Scurvy," "The Dietary Deficiency Diseases (*Continued*), Beriberi and Polyneuritis," "Chemical Nature of the Anti-neuritic Substance, Water-soluble B," "Xerophthalmia (Keratomalacia)," "Chemical Studies of the Dietary Essential, Fat-soluble A," "The Relation of Pellagra to Diet," "The Relation of the Diet to the Etiology of Rickets and Related Conditions," "The Nursing Mother as a Factor

of Safety in the Nutrition of the Suckling," "New Viewpoints Relating to Practical Problems of Nutrition," "The Dietary Habits of Man in Several Parts of the World," and "The Most Fundamental Problem in Preventive Dentistry." To each chapter is appended a very complete bibliography in which are to be found references to the original works referred to in the substance of the chapter. Of particular interest is the tribute paid in the first chapter to the American chemist, Atwater, and his associates, whose work (in connection with that of Voit) in the analysis and classification of a great number of articles of subsistence, and whose development of the respiration and bomb calorimeters constituted truly a "great epoch" in the development of the science of nutrition. The discussion of "A Biological Method for the Analysis of a Food-stuff" sets forth with admirable clearness and frankness the earlier errors and confused conclusions into which the author, as well as other investigators, were at first led by the failure to recognize the fact that supposedly pure food substances employed experimentally were not in reality pure, and more particularly by the omission on the part of students of nutrition to make careful study of and attach adequate importance to pathological findings in the deficiency diseases. Throughout the work the historical aspect of the development of each individual element in the whole science of nutrition is carefully traced, and thus from this point of view the reader is afforded an opportunity to visualize the focus toward which all individual studies have been—and still are—trending. In particular every paragraph of the "Dietary properties of food-stuffs" brings out, either directly or by implication, the fact that diets composed of various subsistence articles may apparently be perfectly well balanced from the purely chemical point of view (in their content of proteins, fats, and carbohydrates), so far at least as analysis can be made to show, but may be decidedly defective in respect to vitamine content. Of milk it is said: "This is the most satisfactory single article of food which is suitable for consumption by man. It is not an ideal food when taken over a long period as the sole source of nutriment, but is the best one with which nature has provided us. It is the one food for which there is no effective substitute." The discussion of "The Vegetarian Diet," while very conservative, leads the author to the conclusion that a strictly vegetarian diet is not to be preferred to one in which moderate amounts of meat are incorporated. This conclusion seems to be best summed up in the following sentences: "It is possible to make a fairly satisfactory diet of foods entirely derived from vegetable sources, but it is not easy to do so. In general, a vegetable diet will be markedly improved by the inclusion of muscle tissue meats, and more so by the addition of glandular organs, but even these features of the subject are not from the standpoint of good nutrition the most important. It is scarcely practicable for man to eat enough leafy foods to succeed with a strictly vegetable diet. The limiting factor is the amount of leafy food which can be consumed. Lack of sufficient calcium is one of the most important deficiencies in such a diet, and a great abundance of leaf is necessary to supply this element in adequate amounts." On the other hand Dr. McCollum's view as to the necessity of including relatively large amounts of the leafy green vegetables in the daily diet list is indicated by his statements that "leafy vegetables possess essentially the same supplementary relations to other foods as does milk," and that "one of the three factors which stood out prominently in my consideration of the types of diets which had succeeded in human experience and with animals, was that certain peoples and many animals were thriving on diets in which the leaves of plants were important articles of food."

Three chapters deal in extensive detail with scurvy, beriberi (and its analogue, polyneuritis in fowls) and with the "Anti-neuritic substance, water-soluble B." Two chapters concern themselves with Xerophthalmia and fat-soluble A. The chapter on pellagra gives the conclusions of the Thompson-McFadden Commission and of Jobling and Peterson relative to the transmissibility of the disease, but the author's tendency to believe

that pellagra is a deficiency disease seems quite definitely indicated by the tone of the rest of the discussion. Rickets and the relation of diet to the causation of this disease are discussed in detail. One chapter deals with "New Viewpoints Relating to Practical Problems of Nutrition," and the gist of this chapter, so far as it concerns the actual chemistry and physiology of food and nutrition, is contained in three sentences: "As the result of the accumulation of data . . . we have come to look upon foods in a new way. Instead of classifying them on the basis of their protein or fat, or carbohydrate content, as was formerly done, we classify them on the basis of their biological properties as foods," and "There is a principle of relativity which is of fundamental importance in estimating the value of a diet as a whole." The author describes the "dietary habits of man in several parts of the world" and seeks to correlate many physical and psychological characteristics with the dietary habits of various populations in different parts of the world. In particular the influence of "iodine as a limiting factor in human and animal nutrition in certain regions" and the effect of lack of iodine upon the thyroid gland are reviewed. "The most fundamental problem in preventive dentistry" is shown to be proper nutrition during development, both prenatal and postnatal.

It may safely be assumed that the "Newer knowledge of Nutrition" contains the last word on its subject up to the date of publication. The information that nutritional investigation has made available to mankind thus far can be of inestimable value in improving the physical and mental characteristics of the race, if practically applied. But we may know that the end is not yet. No one—least of all those who know most concerning the subject—can think of denying that much still remains to be learned. One brief reference on the part of Dr. McCollum, previously quoted, suggests the suspicion that as the two branches of biological science, nutrition and endocrinology, continue to progress, their lines of advance will be found to converge perceptibly.

A. N. TASKER,

*Major, Medical Corps, U. S. Army.*

NOUVEAU TRAITE DE MEDECINE, By G. H. Roger. Fernand Widal, P. J. Tossier. Fascicule V. Maladies infectieuses et parasitaires—Cancer. Pp. 748, 35 figures and 4 colored plates. Paris: Masson et Cie. Price, 50 fr.

This is the concluding volume upon infectious and parasitic diseases in the new French system of medicine and also includes the subject of cancer. The volume is a worthy successor of those that have preceded it and brings to a close perhaps the most scientific and valuable series of volumes upon the infections that have appeared in any language.

The volume opens with short but adequate chapters upon chancroid by Demanche, yaws by Joyeux, recurrent fevers by Nicolle and Blaizot, and rat bite disease by Thibaut. These are followed by Vincent and Rieux's article upon malaria which, while somewhat disappointing when the great importance of the subject is considered, is a very good consideration of the subject. It is noted that the authors use the name *Plasmodium immaculatum* and *Plasmodium praecox* for the aestivo-autumnal or malignant tertian plasmodium despite the fact that the name *Plasmodium falciparum*, given this species of malaria plasmodium by Welch, has priority over either of the above names for this species and, therefore, is the proper name according to the law of priority as applied in nomenclature. The chapter is well illustrated by two beautiful colored plates showing the various forms of the different species of malaria plasmodia stained with the Romanowsky method. The same authors write the article upon hemoglobinuric fever, which is rather brief but comprehensive.

Kala-Azar is very briefly considered by Nicolle, and this contribution is disappointing when one considers the fame of the writer and his many valuable papers upon the etiology

of the infantile type of the infection. The subject would seem to be deserving of a more extended treatment in a system of medicine of the character and size of the one in which this article forms a part, and the lack of a colored plate illustrating *Leishmania donovani* is felt, by the reviewer, to be a serious omission. The same remarks are equally true of the same author's treatment of oriental sore, the entire description of which only covers three and a half pages with no illustrations.

The chapters upon trichiniasis, by Joyeaux, and those on filariasis, distomatoses, coccidiosis and sarcosporidiosis, by Guiart, are short but excellent descriptions of these conditions and are fairly well illustrated. Trypanosomiasis and infection with the schistosomes are well treated of by Brumpt, and the illustrations are excellent.

The remainder of this volume, comprising no less than 400 pages, is devoted to a monographic chapter upon cancer, by Roussy and Wolf. This very noteworthy contribution considers the subject from every standpoint and will undoubtedly long be considered a classic. The history of cancer, the various theories regarding its etiology, the experimental evidence supporting these theories, the pathology of the various types of malignant tumors and the clinical symptoms and treatment are all very exhaustively considered and the text is illustrated with colored plates and many beautiful woodcuts. The chapters upon cancer in animals and plants and upon experimental cancer are most interesting and valuable, and the statistical study of the occurrence of cancer, which closes the monograph, is most suggestive. This is really a remarkable monograph upon a subject of constantly increasing interest.

CHAS. F. CRAIG.

NOUVEAU TRAITE DE MEDECINE, by G. H. Roger. Fernand Vidal, P. J. Tessier. Fascicule II. Maladies infectieuses. Pp. 766, 89 figures and 8 plates. Paris: Masson et Cie. Price, 50 fr.

The second volume of this monumental work well supports the reputation achieved by the first volume which was reviewed in this publication several months ago. The present volume contains articles upon several of the most important of the infectious diseases, those by Tessier upon the eruptive fevers being especially valuable and worthy of careful study. The colored plates illustrating the various eruptions encountered in scarlet fever, measles, smallpox and chicken pox are the most beautiful and accurate that the reviewer has seen in any work dealing with these fevers, while the text leaves little to be desired as regards accuracy and clinical value.

The chapter dealing with vaccinia is written by Tessier and Tanon and is a very valuable and comprehensive consideration of the subject. The colored plate illustrating the vaccinal lesion is almost perfect in its portrayal of the condition and lends an added value to a very excellent description.

Ravaut writes of the herpetic fevers, Menard of aphthous fever, Renault of miliary fever, Roger of anthrax, Nicolle and Conseil of typhus fever, Londe of whooping cough, and Tessier and Esmein of mumps. All these chapters are excellent, up to date and are well illustrated. They are followed by a most valuable monograph upon diphtheria written by Aviragnet, Weill-Halle and Marie, which covers 150 closely printed pages. It is doubtful if any treatise on medicine contains a more comprehensive description of this very important infection, and the authors are to be congratulated upon this fine contribution to our knowledge.

The volume concludes with excellent chapters upon tetanus by Camus and Gournay, acute articular rheumatism by Barbier, dengue by De Brun, and pappataci fever by the same author.

Throughout this volume, as was the case with the first volume of this new treatise on

medicine, much more space is devoted to the bacteriology and pathology of the infections considered than is usually noted in similar works, thus making the volume of great value not only to the practicing physician but to the medical scientist. While this is true, there has been no sacrifice as regards the clinical descriptions or the consideration of the diagnosis, prophylaxis or treatment of the diseases described. In this respect it is believed that this new system of medicine establishes a model that could well be copied by future editors of medical systems.

CHAS. F. CRAIG.

PULMONARY TUBERCULOSIS, by Maurice Fishberg, M.D. Third edition, revised and enlarged. Illustrated. Philadelphia and New York: Lea and Febiger, 1922. Price, \$8.50.

The favor with which this well-known work has been received is shown by the fact that two editions have been exhausted within five years. This, the third edition, has been entirely reset, and the author has taken advantage of the opportunity to rewrite entirely some of the chapters and to make extensive changes and alterations in many others. Two new chapters have been added, one on the reciprocal relations between pulmonary tuberculosis and certain physical and pathological processes and another on the medico-legal aspects of tuberculosis. The American student of tuberculosis, too often remote from great medical libraries, when he undertakes the investigation of some phase of the subject, labors, as a rule, under the disadvantage that he can only ascertain with great difficulty what has already been written on the points which he desires to elucidate. And even in a well-stocked library it is by no means easy to discover in the enormous mass of the literature what the really important articles are. This work is one of the best guides to the general literature that is known to the reviewer. The author is very widely read and his book abounds in references to the most important work that has been done in the several subjects. It is quite worth while to possess Fishberg's "Tuberculosis" simply as a guide to the tuberculosis literature. But in thus dwelling upon the less obvious merits of Dr. Fishberg's work it is not desired to minimize in any way its value as a systematic treatise. Its scope is encyclopedic; it touches upon practically every phase of the enormous subject, and in every case the author either expresses his own opinion or, when dealing with the more obscure questions, states frankly the incompleteness of our knowledge of the subject considered. The book is therefore a useful manual for one who wishes to obtain a knowledge of the scientific side of the study of tuberculosis under the guidance of a student who not only possesses a wide acquaintance with the literature but also, while he presents both sides of a question, does not hesitate to give the reasons for his own opinion concerning it. But the author is not simply a student who has digested the literature, but also a practitioner in a wide field who utilizes his own experience in the practical matters of diagnosis and treatment. Naturally, when so many topics are presented the treatment of each cannot be intensive, but always the treatment is clear and logical and the grasp of the author upon his enormous material is so firm that his opinions deserve to be very carefully weighed. And if his presentation leads the reader to investigate farther, so much the better. The great weakness of the American literature on tuberculosis has been in the past a lack of familiarity with what has already been accomplished. The result has been too often an adherence to what might be called an orthodoxy which is based more upon dogma than upon unexceptionable investigations. We need to realize that our dogmas are often simply provisional explanations for imperfectly observed groups of facts. For such a realization a wider knowledge of the literature is essential.

G. E. BUSINELL.

THE DIAGNOSTICS AND TREATMENT OF TROPICAL DISEASES, by E. R. Stitt, A.B., Ph.G., M.D., Sc.D., LL.D.; Rear Admiral, Medical Corps, and Surgeon General, U. S. Navy; Graduate, London School of Tropical Medicine; Member, National Board of Medical Examiners; Member, Advisory Board, Hygienic Laboratory. 8°, 4th edition, revised. Pp. 622, 159 illustrations. Philadelphia: P. Blakiston's Son & Co., 1922.

The scholarly Surgeon General of the Navy has contributed to medical literature two books which, upon the appearance of their first editions, received instantaneous and enthusiastic approval at the hands of workers in the fields with which they individually and severally deal. One of these, "Practical Bacteriology, Blood Work and Animal Parasitology," is quite constantly to be found in the hands of a considerable proportion of students in any laboratory class, and many an instructor in the subjects appearing in the title of that particular work has been met, in the discussion of some moot question, by the statement "Stitt says . . ." from the lips of a student and in a tone that implied that by his quotation the matter was settled once and for all. The second of the two publications referred to is probably—and naturally—not quite as well known in the medical circles of temperate climates, since it is "The Diagnostics and Treatment of Tropical Diseases." The first edition appeared in 1914 from the press of P. Blakiston's Son & Company, and the same publishers have very recently offered the fourth edition to the profession. In the preface to this fourth edition the author states that, dependent upon his acceptance of the spirochaetal etiology of yellow fever as worked out by Noguchi, the chapter on this disease has been transferred to that section of the book in which the protozoal diseases are handled, and that he has added thereto all the other more important features of the recent extensive additions to the knowledge of this malady. He looks upon the revisions that have been made in connection with the scientific conception of the various food-deficiency diseases (notably beri-beri and pellagra) as among the most important in the whole volume. The discussion of the treatment of tropical diseases has been in many instances expanded, and in particular a description of the treatment of hookworm infestation by carbon tetrachloride, and remarks upon the methods in the administration of arsphenamine and antimony have been added. Part I includes five chapters which do not appear in the third edition, viz.: "Epidemic Jaundice," "Rat-bite Fever," "Tularaemia," "Tables of Diseases due to Helminths and Arthropods," and "Trench Fever"; while in Part II there is found one new chapter which discusses the diagnostics of tropical joint, muscle and bone lesions. Finally, it is stated that "in the chapter on blood examinations will be found a presentation of our latest views as to acidosis as well as a table giving the significance of the findings in blood chemistry."

An examination of the text proves that all the claims set forth in the preface have been made good. Specifically it is seen that the illustrations have been somewhat changed. Several new ones have been added, and of those appearing in the third edition not a few have been replaced by others of greater illustrative value. Thus the four "principal blood spectra" in the third edition have been expanded into eight "most important clinical spectra" in the fourth edition. A photographic reproduction of *Conorhinus megistus* has been inserted in connection with the textual description of Brazilian trypanosomiasis. The chapter on yellow fever contains a dark field view of *Leptospira icteroides*. In the chapter on "Leishmaniasis" appears an illustration showing "A case of leishmaniasis from Brazil showing lesions in the mouth." Additional diagrams illustrative of the differential points in the anatomy of the flea appear in the discussion of plague. There is presented a "Section of spleen showing lepra cells and lepra bacilli" in the new edition. In the chapter on "Filarial infections" is a new diagram entitled "Section of *Stegomyia pseudoscutellaris*, showing filariae in thorax on tenth day of development, traveling forwards into proboscis," and a photographic reproduction of "Female guinea-worm (*Dra-*

*cunculus medincensis*), lying under the skin of the forearm." One diagram depicts the position of the female of *Schistosoma japonicum* in the gynæcophoric canal formed by the male. The lesions of tertiary yaws are very adequately shown. A photograph of a case of venereal granuloma has been added. These are some, but not all, of the additions and improvements which have been made in the elements of illustration.

No higher praise can be offered in behalf of this latest edition than to say that it maintains for the present day the same authoritative standard of excellence which characterized its predecessors.

A. N. TASKER,

Major, Medical Corps, U. S. Army.

CONTEMPORARY SCIENCE: Edited with an introduction by Benjamin Harrow, Ph.D.

Author of "From Newton to Einstein," "Eminent Chemists of Our Time," "Vitamines," "Essential Food Factors." 16°, 253 pages. New York: Boni and Liveright, Inc., 1921.

What is science? "Knowledge; comprehension or understanding of facts or principles." "Knowledge gained by systematic observation, experiment, and reasoning; knowledge coördinated, arranged, and systematized; also, the prosecution of truth as thus known, both in the abstract and as a historical development." "Knowledge regarding any special group of objects, coördinated, arranged, and systematized; what is known concerning a subject, systematically arranged; a branch of knowledge: as, the *science* of botany, of astronomy, of etymology, of metaphysics; mental *science*; physical *science*; in a narrow sense, one of the physical sciences, as distinguished from mathematics, metaphysics, etc." These definitions satisfy in the material sense, and one of them suggests the fundamental psychology of science. Science is essentially truth, and the genuine scientist is devoid of interest other than his desire to know what is the truth, what are the facts, in that field of research wherein he delves. That so great a concept should have spurious imitations which seek to clothe themselves in its garb and masquerade under its name is in no wise surprising. It has been always thus; it will always be so. But that there should be men—men ofttimes of real ability, but of little moral worth—who, for purposes of self-aggrandizement, attempt to twist the truths and facts of science to fit in with their own preconceived fancies and propounded theories, is a pitiful commentary on the turpitude of those who seek to lead into the bypaths of ignorance and prejudice, and upon the poverty of insight and discrimination possessed by those who follow. The veritable man of science is his own severest critic, and seeks as diligently as another to discover facts that may confound himself; the pseudoscientist fights to the last ditch to maintain the preëminence of his own theorems, and to derive therefrom such material gain as may be.

To carry out his expressed intention of affording to the world of lay intelligence a *coup d'oeil* over the demesne of modern science—real science—Dr. Harrow has brought together in one small volume twelve essays, or theses, or contributions, or whatever they may be called, each from the pen of a recognized authority, and each treating the subject with which it deals lucidly, not too technically, and in a manner calculated to hold the interest of the lay reader and impart to him real information. Of these twelve contributions eight are reprinted addresses or papers previously delivered or read before various scientific societies of America by their authors. It is interesting to observe that of the twelve subjects selected, presumably with the intent to view all the subdivisions of the field of science from such an angle as to make evident their relative importance, there are no less than seven which deal with the so-called "medical sciences." As an explanation of this choice the reader may, perhaps, allow himself to rely solely upon the fact that the editor is associate professor of physiological chemistry in Columbia University, and that he



is thus, although not a doctor of medicine, so closely associated with the problems of normal and pathological processes in the animal body as to be at one in his essential aims and interests with the physician. But is this broad explanation—a more or less superficial one—necessary? Is it not true, after all is said and done, that the grand division of scientific knowledge which most intrigues human interest is that which deals with man himself, with the welfare of his body and his mind, with the causes which disturb the normal serenity of physical and mental life, and with the measures which lie ready to his hand to prevent or cure the maladies to which his flesh is heir?

Following an introduction written by the editor, in which he makes brief mention of a few of the subjects to be treated in the succeeding pages, there comes an article on "Modern Physics (A lecture delivered at the Fourth Midwinter Convention of the American Institute of Electrical Engineers, New York, February 15, 1917)," by R. A. Millikan, Professor of Physics, Chicago University. The titles of the remaining papers are as follows:

"The Structure of Atoms and its Bearing on Chemical Valence," by Irving Langmuir, General Electric Company.

"Engineering before and after the War (Address of the president of the British Association for the Advancement of Science, Bournemouth, 1919)," by Sir Charles Parsons.

"Methods of Gas Warfare (Report of a lecture delivered before the Washington Academy of Sciences on January 17, 1918)," by S. J. M. Auld, D.S.M., British Military Mission.

"What are Enzymes?" by Benjamin Harrow.

"Natural Death and the Duration of Life," by Jacques Loeb, The Rockefeller Institute for Medical Research.

"The Physiology of the Aviator (Address before the Harvey Society, New York City, March 22, 1919)," by Yandell Henderson, Professor of Physiology, Yale University.

"Twenty-five Years of Bacteriology: A Fragment of Medical Research (Address of the President of the American Association for the Advancement of Science, Chicago, 1920)," by Simon Flexner, Rockefeller Institute.

"Before and after Lister (Two lectures before the U. S. Army Medical School, Washington, D. C., April 27 and 28, 1915)," by W. W. Keen, Emeritus Professor of Surgery Jefferson Medical College, Philadelphia.

"The Measurement and Utilization of Brain Power in the Army," by R. M. Yerkes, Chief, Section of Psychology, Office of the Surgeon General.

"Conceptions and Misconceptions in Psychoanalysis (Read before the Harvey Society of Johns Hopkins University)," by Trigant Burrow, M.D.

"Einstein's Law of Gravitation (Address of the President of the American Physical Society, St. Louis, 1919)," by J. S. Ames, Professor of Physics, Johns Hopkins University.

It is not easy to predict which of these discussions would normally attract the greatest amount of *general* attention among the readers of the *MILITARY SURGEON*, whose interests are as diversified as the realm of medicine is broad. The physiological chemist will turn at once to the article on "Enzymes"; the medical officers of the Army and Navy who have qualified as air pilots will see nothing but the "Physiology of the Aviator"; the knights of the Petri dish and microscope will concern themselves with Dr. Flexner's historical sketch of "Bacteriology"; the name of Lister will invite the surgeon's eye; while those gentlemen who assert that "all the world's queer but me and thee, John, and sometimes I think thee's a little queer too" will point proudly to the two articles on military psychology and psychoanalysis as evidence of the preponderating importance of their own specialty. We may confidently expect that the votes of each of these several groups of specialists will be cast for first choice as implied in the preceding sentence; but if their

second choice were demanded, it would not be unthinkable that a majority of them would find their interest, in this breathing spell between wars, most aroused by the consideration of "Natural Death and the Duration of Life."

Man has often sought to know why he grows old and why he dies. It has long been the fashion, among certain biologists at least, to put the guilt of his senility and death upon friend Germ, and the theory has been seriously advanced that, if our species could but rid itself of the incubus of a continual struggle for existence in which we are obliged to contend with innumerable parasitic microorganisms pertaining to both the animal and vegetable kingdoms, human life might persist forever (or, at least, until its possessor chooses to divest himself of it), and that without essential impairment of mental or bodily capacity. In other words, natural death has been denied, and the end of human existence has been claimed to be always the result of disease or injury. This theory has been impossible of demonstration on the bodies of men, since no possible method has ever been discovered whereby the human intestine and respiratory tract can be kept free of bacteria and other unicellular invaders. A solution of the problem—or rather an answer to the question—has been supplied through experiments on insects. Freshly laid eggs of the house fly were immersed for several minutes in a solution of mercuric chloride. The eggs were in great measure destroyed as a result of this treatment, but a few maintained their germinative power and were rendered free of microorganisms by the treatment to which they had been subjected. These eggs were kept on sterilized meat in sterile containers. The egg gave place to the larva, the larva to the pupa, and from the pupa there emerged in course of time an aseptic fly. Other workers have continued those experiments using fruit flies, as shown by Dr. Loeb, and have succeeded in raising many generations of similarly aseptic insects. These favored hexapods have been absolutely protected from the possibility of parasitic disease and from accident or violent death. Following their deaths—necessarily natural deaths—the dead bodies have been transferred to appropriate culture media, and such media have remained free from bacterial growth in the experiments reported upon for years. All this is taken to indicate that natural death is the inevitable outcome of animal life. Indeed life, for a few days or a few years, may be conceived of as only an incident, an interruption, in the course of eternal death.

Dr. Loeb recounts the results of the experiments carried out with these aseptic flies for the purpose of "testing an idea concerning the duration of life which presented itself, namely, that old age and natural death are due either to the gradual production in the body of a sufficient quantity of harmful or toxic substances or to the gradual destruction of substances in the body required to keep it in youthful vigor, or to both. On this basis the natural duration of life would be in reality the time required to complete a chemical reaction, or a series of chemical reactions, resulting in the production of toxic compounds in a quantity sufficient to kill or resulting in the destruction of necessary compounds." Physical chemistry has shown that "the period of time required to complete a chemical reaction diminishes rapidly when the temperature is raised and increases rapidly when the temperature is lowered. Experiments show that the time required for the completion of a chemical reaction is doubled or trebled when the temperature is lowered by ten degrees centigrade." The author advances the hypothesis that if, then, life is a series of chemical reactions, and if the duration of life is the time required for the completion of these reactions, such life will be lengthened or shortened accordingly as the average of the temperatures in which it is passed is lowered or raised. Various batches of aseptic flies were observed at temperatures maintained constantly at 10, 15, 20, 25, 27.5 and 30 degrees Centigrade, and it was found that "the duration of life of such aseptic flies was a definite one for each temperature, which means that all the flies died at practically the same age when kept at the same temperature." Those insects kept at a temperature of

30° C. lived 21.15 days, and it is further stated that "the overwhelming majority died at that age, but a few died a little earlier and a few a little later." The other flies lived varying lengths of time as shown in the following table extracted from the article in question:

<i>Temperature,</i> °C.	<i>Average duration of life of the fly</i> <i>from egg to death, days</i>
25	38.5
20	54.3
15	123.3
10	177.5 + x

"This table shows that the influence of temperature on the duration of life of the fly is the same as the influence of temperature on the velocity of a chemical reaction, inasmuch as the lowering of a temperature by 10 degrees results in an increase in the duration of life by 200 or 300 per cent, and the same figure would be obtained if we investigated the effect of temperature upon the time required to complete the chemical reaction." The theoretical application of these experiments to the duration of human life is contained in the following sentences: "If it were possible to reduce the temperature of human beings and if the influence of temperature on the duration of life were the same as that in the fruit fly, a reduction of our temperature from 37.5° to about 16° C. would lengthen the duration of our life to that of Methusaleh; and if we could keep the temperature of our blood permanently at 7.5° C., our average life would (on the same assumption) be lengthened from three score and ten to about 27 times that length, i.e., to about nineteen hundred years. Unfortunately our body does not tolerate any considerable lowering of its temperature, and if it did, life at so low a temperature would probably become very monotonous and uninteresting, since in all probability sensations of pleasure as well as pain, of joy and of sadness, would be at a very low level.

"The experiments on aseptic flies therefore lend support to the idea that the duration of our life is the time required for the completion of a chemical reaction or a series of chemical reactions. If these reactions consist in the gradual destruction of substances required for a youthful condition, we understand why senile decay and death are the natural result of life."

Professor Harrow has done a real service to general culture in collecting the contents of this small book and putting them conveniently between two covers so that they may be made easily available for the busy man and woman who would not otherwise be likely to come in contact with more than one or two, if any, of these scholarly summaries of "Contemporary Science."

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ENDOCRINE GLANDS AND THE SYMPATHETIC SYSTEM, by P. Lereboullet, P. Harvier, H. Carrion, A. G. Guillaume. Translated by F. Raoul Mason, M.D., Instructor in Pediatrics, New York Postgraduate Medical School and Hospital; Assistant Attending Physician, Willard Parker Hospital; Assistant Pediatricist, New York Postgraduate Medical School and Hospital; Out-patient Department Assistant Attending Physician, Babies' Ward, New York Postgraduate Medical School and Hospital. With the collaboration of Daniel R. Ayres, A.B., M.D., Assistant Professor of Gynecology, New York Postgraduate Medical School and Hospital; Assistant Visiting Obstetrician, City Hospital, New York. 8°, 378 pp. Philadelphia and London: J. B. Lippincott Company, 1922.

Up to the time of the European War scientific works of foreign origin appearing in this country in English translations very largely bore the "Made in Germany" mark.

French science was very scantily represented. This was due to the fundamentally different courses of action pursued by the two nations. The Germans spread themselves abroad over the face of the earth carrying with them their literature, science, and art, and translating their writings on those subjects into the languages of all the countries to which they went. In the United States German works in all branches of science—mathematics, engineering, chemistry, and medicine—have appeared in profusion, and many of them have served as textbooks in our institutions of higher learning. The Frenchman, on the other hand, looking upon France as the garden spot of the earth, stayed at home. A few went to Germany for purposes of study, a very few received a portion of their education in England, and the rest remained within the confines of the land of their birth. They made too little effort to establish and maintain scientific relationships with their confrères of the western hemisphere, and on the rare occasions when French scientific literature was translated into English it was done rather at the instance of the English-speaking-and-reading peoples than of the French themselves.

During the course of the World War Frenchmen clearly recognized and frankly avowed the disadvantages of their self-formulated policy of isolation, and one evidence of a distinct purpose on their part to institute a closer *rapprochement* with their former allies of fighting days in the matter of science and the humanities is the increasing frequency with which the English translations of French literature on many subjects are appearing among us. A few such books have heretofore been reviewed in these columns, and the work of MM. Lereboullet, Harvier, Carrion and Guillaume, as translated by Dr. Mason, with the collaboration of Dr. Ayres, is the contribution of French medical science to the subject of endocrinology most latterly received by this journal.

In just what organ or system of the human body is the "seat of life?" To the various viscera—the brain, heart, liver, intestines, even the spleen—there has been assigned at different epochs in the development of physiological science the supreme rôle in the maintenance and direction of all bodily activity. The last claimant for this honor is the endocrine corporation, whose interlocking directorate is so wonderfully organized that when the functions of any one of its members are temporarily or permanently, partially or completely, abdicated, the remaining members of the system attempt to take up and carry on the work of the defaulter. The overwhelming importance of the ductless glands is becoming every day more and more evident, so that it begins almost to seem that there has been at last brought under investigation the one really fundamental element in the maintenance of normal health and the continuance of animal life. Anatomical and experimental researches, clinical and therapeutic observations have been enormously multiplied in recent years; but the conception of internal secretions, although having been initiated by Claude Bernard in 1865 when he discovered the glycogenic function of the liver, was slow in gaining the attention of workers in science and of securing the recognition to which it was entitled. It was not, in fact, until the study by Brown-Sequard in 1889 of the therapeutic action of testicular extract that the science of endocrinology can be said to have been established upon any sort of foundation worthy of the name, and even at that progress has only been rapid within the last ten or fifteen years. One land-mark consisted in the experimental evidence obtained by Mering and Minkowski as to the histological changes occurring in the pancreas in diabetes and the etiological importance of such changes in the production of that disease. The modes of approach to endocrinology, in its present-day offering of a wonderfully fruitful field for investigation and research, may be classified as follows:

(a) Histological, in which the structure and visible processes of the gland while in a state of activity are studied.

(b) Chemical, whereby extracts of the various organs under consideration have been secured and their pharmacological action has been in some measure defined.

(c) Physiological, to which we owe in large measure the knowledge that is now available as to the specific action of substances extracted from the gland or, more particularly, from the blood of the vein leading from that gland.

Of the chemistry of the internal secretions very little is as yet known, of their effects somewhat more is understood. It was early recognized that these ductless glands produce substances whose action upon other glands or various tissues was essentially specific in its character. Thus the substance secreted by the thyroid gland has a direct effect upon the processes of metabolism, and its absence or insufficiency will be productive of nutritional disorders. These glandular products whose effects are those of specific stimulation have been termed "hormones." The hormones have been conceived to be responsible for the "functional correlation of chemical origin" in contradistinction to the "correlation of nervous origin." In addition to the hormones the ductless glands also secrete substances which they themselves utilize or which are made use of by tissues in other parts of the body. These are not of the nature of stimulants, but rather to be classed among the nutritive elements. Within this category are to be included the glycogen of liver origin and the fats. Still further subdivision of the internal secretions has been made by various workers in this field, but the lines of distinction are not yet perhaps as sharply drawn in respect to them as is true in the cases previously stated. It may, however, not be inappropriate to mention the "harmozones" of Gley, which are held to be regulating or morphogenetic substances and which exercise a supervisory control over the general development of the animal body. The most notable and important of these harmozones is the internal secretion of the pituitary gland.

One who devotes oneself to the study of endocrinology must come very shortly to an appreciation—if not an understanding—of the extreme complexity of the mechanism by which the activity of this chain of elements is governed. The secondary manifestations of the disorders of the various ductless glands have served to enlarge, perhaps more than any other one factor, the field of endocrinology; and under this heading and in this domain we have now come to include, not only those glands which were from the first looked upon as having only internal secretions (thyroid, pituitary, suprarenal, etc.), but as well the thymus, spleen, bone marrow, liver and others. As a logical conclusion to this expansion of the concept of internal secretions, the question finally presents itself as to whether all cells of all tissues have or have not the capacity for producing substances which, being taken directly into the blood stream, may be thus looked upon as partaking of the nature of internal secretions.

Of all this and much more Dr. Lereboullet treats in his introductory remarks upon "General considerations on the endocrine glands and their pathology" to the volume with which this review concerns itself. An outline of the contents of this work is as follows:

*Introduction:*

GENERAL CONSIDERATIONS ON THE ENDOCRINE GLANDS AND THEIR PATHOLOGY.

- I. Normal and pathological anatomy and physiology of the endocrine glands.
- II. The clinical endocrine syndromes.
- III. General therapy of disease of the endocrines.

PATHOLOGY OF THE ENDOCRINE GLANDS.

- I. Pathology of the thyroid.
- II. Thyroid insufficiency syndromes.
- III. The syndromes of hyperfunction of the thyroid.
- IV. Pathology of the parathyroid glands.
- V. Pathology of the thymus.

## PATHOLOGY OF THE ADRENALS.

- I. Syndromes of adrenal insufficiency.
- II. Syndromes of hyperfunction of the adrenals.
- III. Adrenal tumors and dystrophies of adrenal origin.

## PATHOLOGY OF THE PITUITARY.

## PATHOLOGY OF THE PINEAL GLAND.

## PATHOLOGY OF THE TESTICLES.

- I. Syndromes of testicular insufficiency.
- II. Syndromes of hyperorchidia.

## PATHOLOGY OF THE OVARIES.

- I. Syndromes of ovarian insufficiency.
- II. Syndromes of ovarian hyperfunction.

## PATHOLOGY OF THE MAMMARY GLAND.

- I. Pluriglandular syndromes.

## PATHOLOGY OF THE SYMPATHETIC SYSTEM.

*Part I.*

## INTRODUCTION TO THE STUDY OF THE NERVOUS SYSTEM OF VEGETATIVE LIFE FROM AN ANATOMICAL AND PHYSIOLOGICAL POINT OF VIEW.

- I. What do we mean by the sympathetic system?
- II. The anatomical vegetative nervous unity.
- III. The components of these systems.
- IV. Anatomical and physiological description of the various elements.
- V. Physio-pharmacological opposition of the two great vegetative systems.

## PATHOLOGY OF THE GREATER SYMPATHETIC.

*Part II.*

- I. Hyperexcitability syndrome of the vegetative nervous system.
- II. Reaction of the vegetative nervous system in the course of disease and visceral affections.
- III. Endocrine sympathetic syndrome.
- IV. Localized sympathetic syndromes.

## ORGANO-THERAPY.

## Pharmacological facts.

Perhaps the most important and noteworthy of all the foregoing subdivisions of the book is that which deals with the "Pluriglandular syndromes." The predominance of this chapter consists not in its extent or in the fullness of detail with which the subject is treated, but in the concept which its title announces of the interaction and interdependence that are coming to be recognized as the most important elements in the whole study of the subject of internal secretions. In the earlier days ductless gland pathology appeared a relatively simple matter, for it was thought that individual glands presided specifically over individual functions of the body, and that disease of any one gland would result only in symptoms referable to the function or the tissue which that gland governed. If this earlier conception had turned out to be the true one, endocrine disease and endocrine therapy would have been relatively simple and therefore easy. But the discovery that disorders of any one gland might bring about, not only disturbances in the functions over which that gland presided, but also histological changes and consequent disturbances of function in other ductless glands, to be followed in turn by disorders of the systems or mechanisms that look to these secondarily involved glands for directive

guidance, and that these processes might be continued indefinitely until the whole endocrine chain had been caught up in the morbid process, has tremendously complicated the entire matter. It has thus come about that the most important element of endocrinologic study is a due recognition of the pluriglandular character of practically all endocrine disease, and of the consequent necessity of extending endocrine therapy to include the extracts of two or more glands—at least in the majority of cases—rather than limiting it to the product of a single gland as has been quite the custom until recently. It is safe to predict that the endocrinologic study of the future will be more colored and directed by this “pluriglandular” consideration (that of universal interaction and interdependence) than by any other single element.

In the preface to the American edition it is stated that “at the request of the authors this translation has adhered, as far as possible, to the original French text.” For the most part it is to be said that the translation is a very intelligible one, and there is no ground to doubt its adequacy. None the less, there are certain sentences which could have been improved from a rhetorical point of view, and therefore from the point of view of clarity, by adhering a little less closely to the “French text.” Thus on page 134 there appears the following paragraph:

“4. General Disturbances.—These disturbances of toxic origin are very variable. They consist of a psychic asthenia characterized by a half-conscious state, or prostration. Sometimes they are quiet; at others they have nightmares, and even delirium. Later coma sets in.” From these sentences it is difficult to decide whether the disturbances, the psychic asthenia, the half-conscious state, or the prostration are “quiet, . . . have nightmares, and even delirium,” and which one of the quartet is the victim of coma. On page 316 it is stated that “Suprarenalin injected subcutaneously in 1 gram doses will cause a stimulation of the sympathetic system in certain individuals. This will manifest itself by dilatation of the pupil, a glycosuria superior to 5 grams per 24 hours after the injection of 100 grams of glucose in the morning, will cause a polyuria, a tachycardia, and an increase in the blood pressure by vaso-constriction. In other individuals this dose will not cause any changes.” It would be interesting to know just the mechanism by which the “individuals” referred to in the last sentence gain so complete an immunity to the action of a full gram (15 grains) of adrenalin injected hypodermically; for this is certainly a massive dose. On page 321 we read: “State of depression, anxiety, pallor of the face, immobility and often dilatation of the pupils, low temperature, rapidity of the pulse, arterial hypotension, etc.” What verb are we to supply to this sentence? Again, “The vegetative neuroglandular system has a physiological excitation of chemical nature and reacts by a clinical manifestation identical to the different pathological manifestations provoked by the preceding causes.” Mud is not clearer.

Examples of faults such as these might be multiplied, but it would serve no useful purpose. Those who translate foreign medical literature into English should remember that their translations are to be read by those whose native language is English, and they should govern themselves accordingly. Too close an adherence to the foreign text will surely do idiomatic damage and will invariably detract in some measure from the scientific value of the translation. It is doubtful if any translation which is to be above reproach when considered in reference both to rhetoric and adequacy can be made otherwise than in two stages. The first of these stages should consist in a quite literal translation of the original; this having been done, the original text is to be put aside and the article thoroughly rewritten in idiomatic English which must at the same time convey all the meaning evidenced in the literal translation.

In spite of certain shortcomings in translation, “Endocrine Glands and the Sympathetic System” is a valuable and important contribution to the subject of which it treats. It makes us know that in the past we have missed something through being denied the

privilege of a more intimate first-hand acquaintance with medical research as it has been advanced by the hands of the French, and it leads to the hope that the profession in America may for the future find at its disposal in much greater measure the accounts of the investigations conducted by the successors of Pasteur, Brown-Sequard, Claude Bernard, Charcot and the other great men of French science.

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